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TABLE OF CONTENTS

ARALIACEAE IMPERII JAPONICI. By *T. Nakai* 1

EHRETIAE QUAEDAM NOVAE ASIATICAE. By *T. Nakai* 36

NOTES ON NORTH AMERICAN TREES, XII. By *C. S. Sargent* 41

NEW SPECIES, VARIETIES AND COMBINATIONS FROM THE HERBARIUM AND THE COLLECTIONS OF THE ARNOLD ARBORETUM. By *Alfred Rehder* 49

RAPHIOLEPIDIS ET ERIOBOTRYAE SPECIES SINO-JAPONICAE. By *T. Nakai* .. 61

SOME NEW AND NOTEWORTHY LIGNEOUS PLANTS FROM EASTERN ASIA. By *T. Nakai* 72

THE RHODODENDRONS OF HUPEH. By *Ernest H. Wilson* 84

THE LIGNEOUS FLORA OF RICH MOUNTAIN, ARKANSAS AND OKLAHOMA. By *Ernest J. Palmer* 108

FORSYTHIA VIRIDISSIMA VAR. KOREANA. By *Alfred Rehder* 134

ENUMERATION OF THE LIGNEOUS PLANTS OF NORTHERN CHINA. By *Alfred Rehder* 137

NOTES ON THE GENUS PINUS. By *George Russell Shaw* 225

NOTES ON CHINESE LIGNEOUS PLANTS. By *H. H. Hu* 227

A NEW SPECIES OF REEVESIA. By *Ernest H. Wilson* 233

NEW SPECIES, VARIETIES AND COMBINATIONS FROM THE HERBARIUM AND THE COLLECTIONS OF THE ARNOLD ARBORETUM. By *Alfred Rehder* 235

ERRATA 242

INDEX 243

JOURNAL
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VOLUME V JANUARY, 1924 NUMBER 1

ARALIACEAE IMPERII JAPONICI

T. NAKAI

Acanthopanax Miq.

Acanthopanax Miquel in Ann. Mus. Bot. Lugd.-Bat. I. 10 (1863).—Seemann mss. ex Seemann in Jour. Bot. v. 238 (1867).—Bentham & Hooker, Gen. Pl. I. 938 (1867), pro parte.—Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 49 (1897), pro parte.

Panax subgen. *Acanthopanax* Decaisne & Planchon in Rev. Hort. 1854, 105.
Kalopanax Miquel in Ann. Mus. Bot. Lugd.-Bat. I. 10 (1863), pro parte.
Panax De Candolle, Prodr. IV. 252 (1830), pro parte.—G. Don, Gen. Syst. III. 384 (1834).

Sect. I. ORTHACANTHOPANAX Nakai, sect. nov.

Acanthopanax Sect. II. *Euacanthopanax* Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 50 (1894), pro parte.

Styli basi, interdum ad apicem coaliti; umbellae glabrae v. subglabrae; flores longe pedicellati.

Subsect. 1. ZANTHOXYLOPANAX Nakai.

Acanthopanax Sekt. *Zanthoxylopanax* Harms in Mitt. Deutsch. Dendr. Ges. XXVII. 26 (1918).

Folia trifoliata: inflorescentia in apice rami annotini elongati terminalis.

Acanthopanax trifoliatum Merrill in Philipp. Jour. Sci. I. suppl. p. 217 (1906).—Schneider, Ill. Handb. Laubholzk. II. 427 (1909).—Rehder in Bailey, Stand. Cycl. Hort. I. 193 (1914).—Harms & Rehder in Sargent, Pl. Wilson. VI. 563 (1916).—Harms in Mitt. Deutsch. Dendr. Ges. XXVII. 26 (1918).

Zanthoxylum trifoliatum Linnaeus, Spec. 270 (1753).—Lamarck, Encycl. Méth. II. 40 (1786).
Panax aculeatum Aiton, Hort. Kew III. 448 (1789).—Willdenow, Spec. IV. 1125 (1805).—Steudel, Nomencl. 583 (1821).—De Candolle, Prodr. IV. 252 (1830).—G. Don, Gen. Syst. III. 384 (1834).
Plectronia chinensis Loureiro, Fl. Cochinch. 162 (1790).
Panax Loureirianum De Candolle, Prodr. IV. 252 (1830).
Acanthopanax aculeatum Seemann in Jour. Bot. v. 238 (1867).—C. B. Clarke in Hooker, Fl. Brit. Ind. II. 726 (1879).—Forbes & Hemsley in Jour. Linn. Soc. XXIII. 339 (1887).—Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 50 (1894); in Bot. Jahrb. XXIX. 489 (1900).—Schneider, Ill. Handb. Laubholzk. II. 427, fig. 290 i–i[1] (1909).—Harms & Rehder in Sargent, Pl. Wilson. II. 564 (1916), pro parte.
Acanthopanax sepium Seemann in Jour. Bot. v. 239 (1867).

FORMOSA: Mt. Niitakayama, *T. Kawakami* et *U. Mori*; Kelung, *T. Makino;* Tappo, *Nagasawa*, no. 3139; near Sozan, prov. Taihoku, *E. H. Wilson*, nos. 11221, 10774; Boryo to Kararu, prov. Koshun, *E. H. Wilson*, no. 11016; Tamsui, *A. Henry*, no. 1460; South Cape, *A. Henry*, no. 335; Bankinsing, *A. Henry*, no. 1516; sine loco speciali, *R. Oldham*, no. 200.

DISTRIBUTION: also Philippines, China, Cochinchina and India.

Henry's nos. 12770 and 12561 determined by Harms as *Acanthopanax trifoliatum* are not that species, but are *Eleutherococcus leucorhizus* Oliver (*Acanthopanax leucorhizus* Harms).

Subsect. 2. EUACANTHOPANAX Nakai.

Acanthopanax Sekt. *Euacanthopanax* Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 50 (1897), pro parte; in Mitt. Deutsch. Dendr. Ges. XXVII. 18 (1918).

Folia digitatim quinata. Umbellae vulgo solitariae laterales; styli bifidi v. fere ad apicem connati.

Foliola varie inciso-serrata, supra sparsissime pilosa, subtus pilosa . . *A. nipponicum.*
Foliola nunquam inciso-serrata.
  Pedunculi elongati foliis aequilongi. Foliola incurvato-serrulata, parva, basi rufo-pilosa . . . . . *A. kiusianum.*
  Pedunculi foliis distincte breviores.
    Foliola mucronato-serrata vel submucronato-grandiserrata. . . *A. commixtum.*
    Foliola crenato-serrata vel spinuloso-crenata.
      Foliola incurvato-crenulata . . . . . *A. spinosum.*
      Foliola subspinuloso-crenulata . . . . . *A. koreanum.*

Acanthopanax nipponicum Makino in Jour. Jap. Bot. II. 5, 19 (1921).

Frutex; rami elongati, cinereo-fuscescentes, sub folio 1-aculeati aculeis rectis rigidis. Petioli glabri vel apice minute spinulosi; foliola 5, obovata vel late obovata varie inciso-serrata, supra viridia, sparsissime pilosa, infra pallida pilosa. Umbellae e gemmis axillaribus rami annotini evolutae foliis 2–3 suffultae solitariae; pedunculi et pedicelli glabri; bracteae filiformes, minimae, deciduae; pedicelli 4–5 mm. longi; calycis margo edentatus vel 5-dentatus; petala viridia; styli bifidi.

HONDO: Hikami, prov. Suwo, *J. Nikai*, nos. 395, 853; Mt. Hiei, prov. Omi, *I. Sono.*

KYUSHU: Nasugoe, prov. Higo, *Z. Tashiro.*

Acanthopanax kiusianum Nakai, sp. nov.

Frutex glaber; rami sordide fuscescentes; aculei rigidi, recti, sub folio solitarii. Folia turionum brevipetiolata sed fasciculata longe petiolata; petioli glabri, 1.5–6.0 cm. longi, graciles sed recti interdum circa apicem infra 1-aculeati; foliola digitatim 5, terminalia maxima, omnia basi cuneata, obovata, apice mucronata, supra medium incurvato-serrulata, 10–37 mm. longa, 5–16 mm. lata, basi rufo-pilosa, supra viridia venis impressis, infra pallida venis elevatis. Pedunculi 4.5–5.0 cm. longi, recti, graciles, glabri; bracteae caducae, minimae, apice ciliolatae. Pedicelli 4–5 mm. longi, glabri; calycis tubus ovatus, lobi ovato-acuti, lucidi; petala viridia, oblongo-ovata, apice unguiculata, 1.5 mm. longa; stamina in nostris speciminibus

brevissima abortiva, ita nostra planta feminea; discus leviter elongatus; styli tantum basi coaliti, recurvi; stigmata papillosa elongata.

KYUSHU: Kajiki, prov. Osumi, *Z. Tashiro;* Mt. Kirishima, alt. 100–1000 m., *Z. Tashiro.*

Acanthopanax koreanum Nakai, sp. nov.

Acanthopanax spinosum Nakai, Veg. Isl. Quelp. 68, no. 947 (1914); non Miquel.

Frutex; rami caespitosi, arcuato-diffusi, sub folio recurvo-aculeati. Folia longe petiolata, fasciculatim 2–3; foliola 5, subsessilia vel brevipetiolulata, basi albo-barbata, late obovata, acuta vel acuminata, supra lucida, infra pallida venis elevatis in axillis venarum primarium barbata. Umbella longipes pedunculo 2–5 cm. longo, multiflora glabra; calycis margo obscure 5-dentatus; petala viridia reflexa, 3 mm. longa; antherae flavae oblongae. Bacca nigra, 7 mm. longa, compresso-sphaerica, apice stylis persistentibus coronata.

KOREA: Quelpaert; Ibi, *T. Nakai*, no. 6358; Hongno, *T. Nakai*, no. 158; insula Piyanto, *T. Nakai;* in Hallai-san, alt. 300 m., *T. Ishidoya.* no. 210; Hongno, *U. Faurie*, no. 893, *E. Taquet*, no. 2916; in silvis, *E. Taquet*, no. 2917; in dumosis, *U. Faurie*, no. 1666; in pago Polmongi, *E. Taquet*, no. 2915.

Acanthopanax spinosum Miquel in Ann. Mus. Bot. Lugd.-Bat. I. 10 (1863), pro parte.—Seemann in Jour. Bot. v. 238 (1867).—Franchet & Savatier, Enum. Pl. Jap. I. 193 (1875).—Marchal in Bull. Soc. Bot. Belg. XX. 89 (1881), pro parte.—Dippel, Handb. Laubholzk. III. 237 (1893).—Koehne, Deutsch. Dendrol. 433 (1893), pro parte.—Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 237 (1894); in Mitt. Deutsch. Dendr. Ges. XXVII. 23 (1918), pro parte.—Schneider, Ill. Handb. II. 427, f. 290 f–g (1909).—Rehder in Bailey, Stand. Cycl. Hort. I. 193 (1914).

Panax spinosum Linnaeus fil., Suppl. 441 (1781).

Aralia pentaphylla Thunberg, Fl. Jap. 128 (1784).—Persoon, Syn. Pl. I. 331 (1805).—Sprengel, Syst. Veg. I. 951 (1825).—Lavallée, Arb. Segrez. 125 (1879).

Aralia ? pentaphylla De Candolle, Prodr. IV. 259 (1830).—G. Don, Gen. Syst. III. 389 (1834).

HONDO: Nikko, *J. Matsumura, J. G. Jack,* Fukushima, prov. Shinano, *H. Sakurai;* Mt. Hira, prov. Omi, *I. Sono;* Mt. Togakushi, prov. Shinano, *J. Matsumura;* Adatarayama, prov. Iwashiro, *K. Nemoto;* Megura near Tokyo, *S. Okubo;* Miyanoshita, prov. Sagami, *C. S. Sargent;* Akabane, prov. Musashi, *H. Sakurai;* Mt. Hagurosan, prov. Sado, *J. Matsumura;* Mt. Ibukiyama, prov. Omi, *J. Nikai*, no. 1980; Otakegawa, prov. Shinano, *E. H. Wilson*, no. 6982[bis]; Nambu, *Tschonoski;* Simoda, prov. Idzu, *C. Wright.*

Acanthopanax spinosum does not occur in China; what has been considered to be that species represents the following two distinct species.

1. **Acanthopanax Hondae** Matsuda in Tokyo Bot. Mag. XXXI. 333 (1917).

Differt ab *Acanthopanace koreano* quo valde affine, umbellis breviradiatis, floribus minoribus, foliis grossius serrulatis. Hoc etiam *Acanthopanacem villosulum* accedit sed foliis subtus non villosis disco viride exquo distinctum.

Acanthopanax Hondae var. **inerme** Nakai, comb. nov.

Acanthopanax spinosum f. *inerme* Matsuda in Tokyo Bot. Mag. XXVI. 281 (1912).

Frutex; caulis arcuatus, cinereus, inermis. Petioli foliorum turionum 3–5 cm. longi, ramulorum brevium 1–4 cm. longi, supra anguste canaliculati, apice cum foliolis articulati ubi villosuli; foliola digitatim 5, media longiora 1.5–5.0 cm. longa, supra glabra costis conspicuis, infra pallida in axillis venarum secundarium rufo-ciliata, margine minute subduplicato-spinuloso-serrulata, late oblanceolata vel oblanceolata, basi cuneata; pedunculi 2.5–4.5 cm. longi, foliis breviores, glabri; pedicelli bracteis parvis setulosis suffulti, glaberrimi, 6–7 mm. longi; calycis dentes deltoidei, vix 1 mm. longi; petala reflexa; styli 2, basi connati, recurvi. Fructus maturus niger, 5–6 mm. longus.

CHINA: Siao-Hsien, Huang-Tsang-Yii, prov. Honan, *J. Hers*, no. 1052; Teng-ka-san, prov. Chekiang, *K. Honda*. Kansu, *Li-Hwang-Ping*.

Acanthopanax Hondae var. **armatum** Nakai, var. nov.

Acanthopanax spinosum Harms & Rehder in Sargent, Pl. Wilson. II. 562 (1916), pro parte.—Harms in Mitt. Deutsch. Dendr. Ges. XXVII. 23 (1918), pro parte.—Non Miquel.

Caulis sub foliis armatus.

CHINA: prov. Chekiang, Ningpo, *Chang-chi-myong;* circa Ningpo, *D. Macgregor;* in fruticetis prope oppidum Tsching-dschen, prov. Kwei-tschou, *H. Handel-Mazzetti*, no. 2044; circa Hangchow, prov. Chekiang, *F. N. Meyer*, no. 1473; Lushih, Hiung-Eul-shan, 1400 m., prov. Honan, *J. Hers*, no. 941; prov. Kiangsu, Kiangyin, *A. Allison*.

2. **Acanthopanax gracilistylum** W. W. Smith in Notes Bot. Gard. Edinb. X. 6 (1917).

Acanthopanax spinosum Hance in Jour. Bot. XVIII. 261 (1880).—Forbes & Hemsley in Jour. Linn. Soc. XXIII. 341 (1887).—Dunn & Tutcher in Kew Bull. Misc. Inform. Add. ser. X. 119 (1912).—Harms & Rehder in Sargent, Pl. Wilson. II. 562 (1916), pro parte.—Harms in Mitt. Deutsch. Dendr. Ges. XXVII. 23 (1918), pro parte.—Non Miquel.

Ab *Acanthopanace spinoso* quocum adhuc confusum est perdistinctum nam folioli inciso-serrulati, pedunculi brevissimi, umbellae pauciflorae.

CHINA: Chang-lo-hsien, Hupeh, *E. H. Wilson*, no. 1973, *A. Henry*. no. 3406A, 1224; Ichang, *A. Henry*, no. 3406; Yunnan, *A. Henry*, no. 10639, *G. Forrest;* in dumetis circa pagum Lantien inter Londi et Ksinkwa, prov. Hunan, *H. Handel-Mazzetti;* Yenan fu, prov. Shensi, *W. Purdom*, no. 350; Yu-tai-shan, prov. Honan, *J. Hers*, no. 290; circa Ningpo, prov. Chekiang, *D. Macgregor;* Huang-Tsang-Yii, prov. Kiangsu, *J. Hers*, no. 1052; Shung hsien, prov. Honan, *J. Hers*, no. 1241.

Acanthopanax commixtum Nakai, sp. nov.

Acanthopanax japonicum Matsumura, Ind. Pl. Jap. II. 2, 417 (1912); non Franchet & Savatier.

Frutex glaber, e basi caespitosus; rami arcuati, cinerei vel cinereo-fuscescentes, sub foliis subrecurve v. recte uniaculeati, lenticellis punctulatis. Petioli 1–10 cm. longi; foliola digitatim 5, rhombea v. late obovata, grosse mucronato-serrata, supra lucida. Flores polygamo-dioici; calyx breviter 5-dentatus; petala ovata, decidua, 2–2.5 mm. longa; stamina in planta feminea evoluta, petalis longiora; styli apice bifidi. Bacca nigra, 5–6 mm. longa, stylis bifidis coronata.

HONDO: Deyu, prov. Echigo, *J. Matsumura;* Aidzu, prov. Iwashiro, *R. Yatabe, J. Matsumura;* Nikko, prov. Shimotsuke, *J. Matsumura, T. Nakai;* Hakone, prov. Sagami, *R. Yatabe*.

Subsect. 3. IONOSTACHYAE Nakai.

Acanthopanax Sekt. *Euacanthopanax* Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 50 (1897), pro parte; in Mitt. Deutsch. Dendr. Ges. XXVII. 5, 18 (1918), pro parte.

Folia digitatim 5(3–4)-foliolata. Umbellae in apice ramorum hornotinorum elongatorum terminales; inflorescentia atro-purpurea; styli bifidi.

Acanthopanax trichodon Franchet & Savatier, Enum. Pl. Jap. II. 377 (1879).—Marchal in Bull. Soc. Bot. Belg. XX. 82 (1881).—Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 50 (1894); in Mitt. Deutsch. Dendr. Ges. XXVII. 26 (1918).—Schneider, Ill. Handb. Laubholzk. II. 427 (1909).—Matsumura, Ind. Pl. Jap. II. 417 (1912).

HONDO: Mt. Kiyozumi, prov. Awa, *S. Okubo;* Jyujyotoge, prov. Kii, *J. Matsumura;* Mt. Amagisan, prov. Idzu, *S. Okubo.*

Sect. II. CEPHALOPANAX Harms in Mitt. Deutsch. Dendr. Ges. XXVII. 5, 14 (1918).

Folia quinata. Umbellae in apice ramorum hornotinorum elongatorum terminales umbellato-racemosae; flores brevi-pedicellati, ita umbellae subcapitatae; styli fere ad apicem connati.

Petioli crebri-aculeati. Foliola subtus saepe secus venas ciliato-aciculata simulque rufo-ciliolata ..... *A. chiisanense.*

Petioli haud v. rarissime aculeati.

Folia subtus subglabra. Pedicelli brevissimi ita flores fere capitati ..... *A. sessiliflorum.*

Folia subtus molliter pubescentia. Pedicelli plus minus elongati ita flores capitato-umbellati ..... *A. divaricatum.*

Acanthopanax chiisanense Nakai, sp. nov.

Acanthopanax sessiliflorum Nakai, Veg. Isl. Quelpaert, 68, 946 (1914); Veg. Mt. Chirisan, 40, no. 341 (1915); non Seemann.

Frutex 2–3-metralis, ramosus; rami glabri inermes; cortex cinereus. Petioli 3–7 cm. longi, glabri, crebri-aculeati; foliola petiolulata, late obovata basi sensim angustata, apice cuspidata, margine argute duplicato-serrulata, supra viridia secus venas primarias minute ciliolata, subtus pallida secus venas ciliato-aciculata et rufo-pilosa. Umbellae lanatae; flores brevi-pedicellati; calyx lanatus, lobis ovatis v. ovato-acuminatis; petala ovato-oblonga, reflexa, decidua; styli 2 in unum concreti; stigmata 2. Drupa nigra, circa 6 mm. longa.

KOREA: Mt. Chiisan, *T. Nakai,* no. 369; Quelpaert, in silvis Yensil, alt. 1000 m., *E. Taquet,* no. 889, 890; in silvis, alt. 1000 m., *E. Taquet,* no. 5660.

Acanthopanax sessiliflorum Seemann in Jour. Bot. v. 239 (1867).—Marchal in Bull. Soc. Bot. Belg. XX. 84 (1881).—Harms in Engler & Prantl, Nat. Pflanzenfam. III. 8, 50 (1894); in Mitt. Deutsch. Dendr. Ges. XXVII. 14 (1918).—Komarov in Act. Hort. Petrop. XXV. 117 (Fl. Mansh. III.) (1907).—Schneider, Ill. Handb. II. 429, fig. 292-a (1909).—Nakai, Fl. Kor. I. 275 (1909); II. 493 (1911); Veg. Diamond Mts. 180, no. 471 (1918).—Rehder in Bailey, Cycl. Am. Hort. I. 11 (1900); Stand. Cycl. Hort. I. 192 (1914).—Bean, Trees & Shrubs Brit. Isles, I. 132 (1916).

Panax sessiliflorum Ruprecht & Maximowicz in Bull. Acad. Sci. St. Pétersb. XIV. 133 (1856); 367 (1857); in Mél. Biol. II. 426 (1857); 545 (1858).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 131 (Prim. Fl. Amur) (1859).—Regel in Mém. Acad. Sci. St. Pétersb. ser. 7, IV. no. 4, 72 (Tent. Fl. Uss.) (1861); in Gartenfl. XI. 238, t. 369 (1862).—Jäger, Ziergeh. 322 (1865).—K. Koch, Dendr. I. 675 (1869).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, VI. 25 (1883); Pl. David. I. 145 (1884).—Lauche, Deutsch. Dendr. 506 (1880).—Koehne, Deutsch. Dendr. 433 (1893).—Dippel, Handb. Laubholzk. III. 234 (1893).—Beissner, Schelle & Zabel, Handb. Laubholz-Ben. 262 (1903).

Cephalopanax sessiliflorum Baillon in Adansonia, XII. 149 (1878).

KOREA: inter Keizanchin et Chosin, *E. H. Wilson*, no. 9115; Yutenji, *E. H. Wilson*, no. 10494; Tumen-Yalu divide *E. H. Wilson*, no. 9069; Suianho, *T. Uchiyama;* Genzan, *T. Nakai;* Mt. Nankanzan, *T. Uchiyama;* Myun-moun-tang, *G. Mills*, no. 444; in Mt. Kongosan, *T. Uchiyama;* Koryo, *T. Mori*, no. 35; Shin pori, *T. Nakai*, no. 5698; Kanghei, *G. Mills*, no. 700; Koyiri, *M. Furumi*, no. 480; Kashunrei, *T. Mori;* Roseidai, *T. Nakai*, no. 9641; Hoang-gui-to, *T. Nakai*, no. 2141; Nojido; *T. Nakai*, no. 2135; Gyomenpo, *T. Nakai*, no. 2134; Kamenkoko, *T. Nakai*, no. 2137.

DISTRIBUTION: also Manchuria, Amur, Ussuri and China (Chili).

Acanthopanax divaricatum Seemann in Jour. Bot. V. 239 (1867).—Franchet & Savatier, Enum. Pl. Jap. I. 195 (1875); II. 378 (1879).—Marchal in Bull. Soc. Bot. Belg. XX. 77 (1881).—Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 50 (1894); in Mitt. Deutsch. Dendr. Ges. XXVIII. 16 (1918).—Schneider, Ill. Handb. Laubholzk. II. 428. fig. 289 o–r (1909).—Rehder in Bailey, Stand. Cycl. Hort. I. 193 (1914).

Panax divaricatum Siebold & Zuccarini in Abh. Akad. Muench. IV. pt. II. 200 (Fl. Jap. Fam. Nat. I. 92) (1846).

Kalopanax divaricatum Miquel in Ann. Mus. Bot. Lugd.-Bat. I. 17 (1863).—Matsumura, Ind. Pl. Jap. II. 2, 420 (1912).

Acanthopanax asperatum Franchet & Savatier, Enum. Pl. Jap. I. 193 (1875), "A. asperata;" II. 378 (1879).—Bretschneider, Hist. Europ. Bot. Discov. Chin. 863 (1898).

YESO: Sapporo, prov. Ishikari, *Y. Tokubuchi;* Junsai numa, *U. Faurie*, no. 5497; Muroran, prov. Iburi, *U. Faurie*, no. 6233; Hakodate, prov. Oshima, *C. J. Maximowicz;* ibidem, *Albrecht.*

HONDO: Nikko, prov. Shimotsuke, *K. Sawada;* Mt. Iwakisan, prov. Mutsu, *J. Matsumura;* Mt. Yatsugatake, prov. Shinano, *E. H. Wilson*, no. 7545; Chuzenji, prov. Shimotsuke, *J. Matsumura;* Agematsu, prov. Shinano, *C. S. Sargent;* Yumoto, prov. Shimotsuke, *C. S. Sargent;* Mt. Ontake, prov. Shinano, *Y. Yabe, G. Koidzumi;* Mt. Togakushi, prov. Shinano, *J. Matsumura, H. Sakurai;* Mt. Iwakisan, prov. Mutsu, *H. Sakurai;* Izunasan, prov. Shinano, *H. Sakurai.*

SHIKOKU: Kamomyomura, prov. Awa, *J. Nikai*, no. 1317.

KYUSHU: Hososhima, prov. Hiuga, *R. Yatabe, J. Matsumura;* Tsuno, prov. Hiuga, *K. Saida;* Mominokimura, prov. Higo, *Z. Tashiro;* Tano, prov. Bungo, *Z. Tashiro.*

Acanthopanax divaricatum var. **inerme** Nakai, var. nov.

Caulis et folia inermia.

KYUSHU: Mt. Homanzan, prov. Chikuzen, *Y. Nabeshi.*

Sect. III. SCIADOPHYLLOIDES Harms in Mitt. Deutsch. Dendr. Ges. XXVII. 30 (1918).

Arborea inermis. Folia digitatim 5-foliolata. Umbellae corymboso-paniculatae, ramis reflexis; styli in unum connati; stigmata biloba.

Acanthopanax sciadophylloides Franchet & Savatier, Enum. Pl. Jap. I. 195 (1875); II. 378 (1879).—Marchal in Bull. Soc. Bot. Belg. XX. 82 (1881).—Schneider, Ill. Handb. Laubholzk. II. 429, fig. 289 s–u (1909).
Kalopanax sciadophylloides Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 51 (1894).—Matsumura, Ind. Pl. Jap. II. 2, 420 (1912).

YESO: Sapporo, prov. Ishikari, *C. S. Sargent, Y. Tokubuchi;* Jyozankei, prov. Ishikari, *J. Matsumura;* Moiwa, prov. Ishikari, *T. Nakai;* Noboribetsu, prov. Iburi (*coll.* ?), Hakodate, prov. Osima, *C. J. Maximowicz;* ibidem, *Albrecht.*

HONDO: in silvis montis Hirosaki, prov. Mutsu, *U. Faurie*, no. 6232; Nikko, prov. Shimotsuke, *C. S. Sargent, K. Sawada;* Chuzenji, prov. Shimotsuke, *J. G. Jack;* Amihari, prov. Rikuchu, *H. Sakurai;* Mt., Tsubakuradake, prov. Shinano, *E. H. Wilson*, no. 7480; near Aomori, prov. Mutsu, *C. S. Sargent;* Azumasan, prov. Iwashiro, *E. H. Wilson*, no. 7194; near Kamado, *C. S. Sargent;* in montibus Sendai, *U. Faurie*, no. 5498; in Mt. Hakkodasan, prov. Mutsu, *H. Koidzumi;* in Mt. Hakusan, prov. Kaga, *R. Yatabe, J. Matsumura;* in monte Iidesan, prov. Iwashiro, *R. Yatabe;* in monte Tateyama, prov. Etchu, *J. Matsumura;* in monte Togakushi, prov. Shinano, *J. Matsumura, H. Sakurai;* Ose, prov. Kodzuke, *B. Hayata;* in monte Komagatake, prov. Shinano, *J. Matsumura;* in monte Komagatake, prov. Echigo, *B. Hayata;* in monte Yenasan, prov. Mino, *H. Sakurai;* Shikayu, prov. Mutsu, *H. Sakurai;* Miharu, prov. Iwaki, *K. Nemoto;* in monte Ontake, prov. Shinano, *G. Koidzumi;* Narutaki, prov. Suwo, *J. Nikai*, no. 736.

SHIKOKU: in monte Yahadzusan, prov. Tosa, *K. Watanabe;* Kurofujikawa, prov. Iyo, *K. Watanabe*, Nakatsuyama, prov. Iyo, *K. Watanabe*,

KYUSHU: Iwadake, prov. Buzen, *R. Yatabe;* Kujyuzan, prov. Bungo, *Z. Tashiro.*

Evodiopanax Nakai

Evodiopanax Nakai, gen. nov.
Kalopanax Miquel in Ann. Mus. Bot. Lugd.-Bat. I. 17 (1863), pro parte.
Acanthopanax Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 49 (1897), pro parte.
Acanthopanax sekt. *Evodiopanax* Harms in Mitt. Deutsch. Dendr. Ges. XXVII. 28 (1918).

Generi Acanthopanaci affine sed calyce sine limbo et pyrenis dorso rotundatis et lateribus non sulcatis ita ambitu hemisphaericis distinctum.

Arbores inermes ramosae glabrae. Folia 1–3 (vulgo 3)-foliolata foliolis minute ciliato-serrulatis. Inflorescentia in apice rami abbreviati terminalis corymboso-paniculata, glabra; flores umbellati, bracteae et bracteolae

minimae v. nullae; pedicelli inarticulati; calycis limbus nullus; petala 5, aestivatione valvata, sub anthesin reflexa, decidua; stamina 5, erecto-patentia; connectivum parvum; discus depresso-hemisphaericus; styli 2, basi coaliti persistentes; ovarium 2-loculare, Bacca nigra, 2-pyrena; pyrenae dorso rotundatae non sulcatae ventre planae; albumen aequabile.—Species 2 in Japonia et China indigenae.

Evodiopanax innovans Nakai, comb. nov.

Panax innovans Siebold & Zuccarini in Abh. Akad. Muench. IV. pt. II. 198 (Fl. Jap. Fam. Nat. I. 90) (1845).

Kalopanax innovans Miquel in Ann. Mus. Bot. Lugd.-Bat. I. 17 (1863).—Matsumura, Ind. Pl. Jap. I. 2, 420 (1912).

Acanthopanax innovans Franchet & Savatier, Enum. Pl. Jap. I. 193 (1875).—Harms in Nat. Pflanzenfam. III. abt. 8, 49 (1894); in Notizbl. Bot. Gart. Mus. Berlin, VII. 65, 248 (1917); in Mitt. Deutsch. Dendr. Ges. XXVII. 28 (1918).—Schneider, Ill. Handb. II. 427 (1909).—Rehder in Bailey, Stand. Cycl. Hort. I. 193 (1914).

YESO: Hakodate, prov. Oshima, *C. J. Maximowicz.*

HONDO: in monte Ontake, prov. Shinano, *G. Koidzumi;* Otakegawa, prov. Shinano, *E. H. Wilson*, no. 6998; Mitake, prov. Kai, *C. S. Sargent*, Chuzenji, prov. Shimotsuke, *N. Mochidzuki;* Nikko, prov. Shimotsuke, *H. Sakurai;* in monte Adzuma-san, prov. Iwashiro, *G. Nakahara;* in monte Enasan, prov. Mino, *H. Sakurai;* in monte Koyasan, prov. Kii, *U. Faurie*, no. 90; Gojyo, prov. Yamato, *J. Matsumura;* Ikedamura, prov. Bitchu. *Z. Yoshino;* Ishiyama, prov. Omi, *I. Sono;* Ouchimura, prov. Suwo, *J. Nikai*, no. 737.

SHIKOKU: Nanokawa, prov. Tosa, *K. Watanabe.*

KYUSHU: Iwatake, prov. Buzen, *R. Yatabe, J. Matsumura;* Shakaindake, prov. Higo, *Z. Tashiro;* Kirishima yama, prov. Osumi, *Z. Tashiro.*

TSUSHIMA: in monte Sumo-shiratake, T. Nakai.

This is a valuable economic tree. Its wood is white and is superior to that of Populus for straw braid used in making hats.

The following Chinese species belongs to this genus:

Evodiopanax evodiaefolium Nakai, comb. nov.

Acanthopanax evodiaefolius Franchet in Jour. de Bot. X. 306 (1896).—Harms & Rehder in Sargent, Pl. Wilson. II. 563 (1916).—Harms in Mitt. Deutsch. Dendr. Ges. XXVII. 29 (1918).

Differt ab *E. innovante* quo arcte affine ramulis non rubescentibus sed sordide cinereis.

CHINA: Mo-Tao-tsin, prov. Yunnan, *Simon Ten*, no. 468, 508; Yunnan, *G. Forrest*, nos. 8887, 10235; Kuling, prov. Kiangsi, *L. H. Bailey;* W. Hupeh, *E. H. Wilson*, no. 1142; Wen-chuan-hsien, *E. H. Wilson*, no. 4204; in silvis prope Molien, prov. Szechuan, *C. Schneider*, no. 1427.

Evodiopanax evodiaefolium var. **ferrugineum** Nakai, comb. nov.

Acanthopanax evodiaefolius var. *ferrugineus* W. W. Smith in Notes Bot. Gard. Edinb. X. 6 (1917).

Folia subtus secus costam et inflorescentiae ferrugineo-pilosa.

CHINA: Shweli-Saboeen, prov. Yunnan, *G. Forrest*, no. 12068.

The *Acanthopanax evodiaefolius* var. *gracilis* W. W. Smith (l. c.) does not belong to this genus for it has 5 styles and 5-celled ovaries and the leaflets are always 5.

Eleutherococcus Maxim.

Eleutherococcus Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 132 (Prim. Fl. Amur.) (1859), sensu ampl.—Bentham & Hooker, Gen. Pl. I. 941 (1867).—Seemann in Jour. Bot. VI. 161 (1867).—K. Koch, Dendr. I. 676 (1869).

Acanthopanax Seemann in Jour. Bot. V. 238 (1867), pro parte.—Dippel, Handb. Laubholzk. III. 235 (1893), pro parte.—Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 49 (1897), pro parte.—Schneider, Ill. Handb. II. 424 (1909), pro parte.

Acanthopanax Sect. *Eleutherococcus* Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 49 (1897); in Mitt. Deutsch. Dendr. Ges. XXVII. 7 (1918).

Acanthopanax Sect. *Euacanthopanax* Harms l. c. (1897), pro parte; l. c. 18 (1918), excl. D. E.

Frutex aculeatus ramosus. Folia digitatim 3–5 foliolata. Umbellae solitariae vel umbellatae; flores cum pedicello inarticulati; calyx obsolete 5-dentatus; petala 5 aestivatione valvata; stamina 5; styli 5 (3–4) toto connati vel apice liberi; stigmata 5 (3–4); discus elevatus; drupa 5-pyrena; pyrenae compressae non sulcatae; albumen aequabile.

Species 13 in Japonia, Korea, Manshuria, Amur, China et Himalaya indigene.

The cohesion of the styles varies specifically but it is of no value in the classification of sections. The characters distinguishing Eleutherococcus from Acanthopanax are neither the cohesiveness of styles nor the presence of articulation in the flowers. No species of Acanthopanax or Eleutherococcus has real articulation at the base of the calyx. The seeming articulation appears in the dried specimens by the contraction of tissues at the base of the calyx. That portion of calyx differs in texture from the apices of the pedicels. The apices of pedicels have hard vascular bundles and do not shrink as much when dried as does the base of the calyx which consists of soft parenchyma. This non-uniform shrinking causes a false articulation. Nearly all of the species belonging to genera other than the Aralia group have with few exceptions inarticulated flowers. Eleutherococcus differs from Acanthopanax by the number of styles and number of cells in the ovary as well as in the shape of pyrenae. In Acanthopanax the number of styles and the cells of ovary is 2, rarely 3. The number of styles and cells of ovary in Eleutherococcus is 5, sometimes 3 to 6. The pyrenae of Acanthopanax are flat or slightly roundish on their ventral side, but those of Eleutherococcus are acute or acutish. I therefore remove all the species of Acanthopanax having 5-celled ovaries and place them under Eleutherococcus. These are *E. pentaphyllum*, *E. Giraldii*, *E. Rehderianum*, *E. cissifolium*, *E. stenophyllum* and *E. Wilsonii*.

Eleutherococcus senticosus Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 132 (Prim. Fl. Amur.) (1859).—Regel in Gartenfl. XII. 84, t. 393 (1863).—Seemann in Jour. Bot. VI. 162 (1868).—Fr. Schmidt in Mém. Acad. Sci. St. Pétersb. ser. 7, XII. no. II. 47, 179 (Fl. Amgunoburej.); l. c. 140, no. 198 (Fl. Sachal.) (1868).—Lauche, Deutsch. Dendr.

507, f. 205 (1880).—Jäger & Beissner, Ziergeh. ed. 2, 146 (1884).—Forbes & Hemsley in Jour. Linn. Soc. XXIII. 382 (1888).—Dippel, Handb. Laubholzk. III. 235, f. 127 (1893).—Koehne, Deutsch. Dendr. 432 (1893).—Rehder in Bailey, Cycl. Am. Hort. I. 528 (1901).—Komarov in Act. Hort. Petrop. XXV. 119 (Fl. Mansh.) (1907).—Nakai, Veg. Diamond Mts. 180 (1918); in Tokyo Bot. Mag. XXVI. 5 (1912).

Hedera senticosa Maximowicz in Bull. Acad. Sci. St. Pétersb. XV. 134 (1856); 367 (1857); in Mél. Biol. II. 426 (1857); 546 (1858).

Acanthopanax senticosus Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 50 (1894); in Mitt. Deutsch. Dendr. Ges. XXVII. 5, 6 (1918).—Rehder in Bailey, Stand. Cycl. I. 193 (1914).—Bean, Trees Shrubs Brit. Isles, I. 171 (1916).

Acanthopanax Eleutherococcus Makino in Tokyo Bot. Mag. XII. 19, in nota sub *Acanthopanace hypoleuco* (1898).

YESO: inter Tokoro et Abashiri, *M. Shirai;* Rubeshibe, prov. Kitami, *E. H. Wilson*, no. 7393.

SAGHALIN: Toyohara, *E. H. Wilson*, no. 7330; in silvis Korsakof, *U. Faurie*, no. 396, 397; in silvis Wladimiroff, *U. Faurie*, no. 37; sine loco speciali, *Augustinowicz.*

KOREA: Koseimen, *T. Nakai*, no. 2136; Kokai, *E. H. Wilson*, no. 10588; Sempo, *E. H. Wilson*, no. 8826; Gyosohyo to Engan, *E. H. Wilson*, no. 8944; Kongosan, no. 434; Kashunrei, *T. Mori;* Juhochin to Kokai; *T. Nakai*, no. 2138; Vallis Czen-dshin-gan, *Komarov*, no. 1149; in monte Hiraiho, *T. Nakai.*

Eleutherococcus senticosus f. **subinermis** Regel, Mém. Acad. Sci. St. Pétersb. sér. 7, IV. no. 4, 73 (Tent. Fl. Uss.) (1861).

Eleutherococcus senticosus f. *inermis* Komarov in Act. Hort. Petrop. XXV. 121 (Fl. Mansh. III.) (1907).

Acanthopanax senticosus f. *inermis* Harms in Mitt. Deutsch. Dendr. Ges. XXVII. 8 (1918).

Caulis et petiolo inermes v. aculeis raris adspersi.

Distribution: Amur, Manshuria and China (Chili).

Eleutherococcus hypoleucus Nakai, comb. nov.

Acanthopanax hypoleucum Makino in Tokyo Bot. Mag. XII. 18 (1898).—Matsumura, Ind. Pl. Jap. II. 417 (1912).—Harms in Mitt. Deutsch. Dendr. Ges. XXVII. 8 (1918).

Eleutherococcus japonicus Makino, l. c. 19. (1898), pro syn. *Acanthopanacis hypoleuci.*

Acanthopanax Fauriei Harms in Notizbl. Bot. Gart. Mus. Berlin, XII. 248 (1917); in Mitt. Deutsch. Dendr. Ges. XXVII. 9 (1918).

HONDO: in monte Norikuradake, prov. Shinano, *U. Faurie*, no. 6841; Misayama, prov. Shinano, *K. Onuma, H. Sakurai.*

SHIKOKU: in monte Kuratakiyana, prov. Tosa, *K. Watanabe;* in monte Torigatayama, prov. Tosa, *K. Watanabe.*

Eleutherococcus japonicus Nakai, comb. nov.

Aralia pentaphylla Siebold & Zuccarini in Abh. Muench. Akad. IV. pt. II. 201 (Fl. Jap. Fam. Nat. I. 93) (1845), excl. syn. *Panax spinosa;* non Thunberg.

Acanthopanax spinosum Miquel in Ann. Mus. Lugd.-Bat. I. 10 (1863), excl. syn. *Panax spinosum.*—Dippel, Handb. Laubholzk. III. 237 (1893).—Zabel in Gartenfl. XXX. 336 (1881).—Non *Panax spinosum* L.

Acanthopanax japonicum Franchet & Savatier, Enum. Pl. Jap. II. 377 (1879).
Acanthopanax pentaphyllum Marchal in Bull. Soc. Bot. Belg. XX. 79 (1881).—Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 50 (1897); in Mitt. Deutsch. Dendr. Ges. XXVII. 21 (1918).—Rehder in Bailey, Cycl. Am. Hort. I. 11 (1900); in Bailey, Stand. Cycl. Hort. I. 193, f. 82 (1914).—Bean, Trees & Shrubs Brit. Isles, I. 131 (1914).
Acanthopanax trichodon Zabel in Gartenwelt, XI. 535 (1909); non Franchet & Savatier.
Eleutherococcus pentaphyllus Nakai, Chosenshokubutsu I. 420 (1914).

YESO: Hakodate, prov. Oshima, *J. Matsumura;* ibidem, *C. J. Maximowicz;* ibidem, *Albrecht;* Otaru, prov. Ishikari, *K. Saida;* Shiriuchi, prov. Oshima, *K. Miyabe* et *Y. Tokubuchi*; Sapporo, prov. Ishikari, *S. Arimoto.*

HONDO: Tokyo, *T. Makino;* Shinobuyama, prov. Iwashiro, *K. Nemoto;* Otakeyama, prov. Shinano, *E. H. Wilson*, no. 6982; Nambu, *Tschnooski.*

Eleutherococcus japonicus f. variegatus Nakai, comb. nov.

Acanthopanax pentaphyllum var. *variegatum* Hort. apud Rehder in Bailey, Cycl. Am. Hort. I. 11 (1900); in Bailey, Stand. Cycl. Hort. I. 193 (1914).—Bean, Trees & Shrubs Brit. Isles, I. 131 (1916).

In hortis cultus.

Kalopanax Miq.

Kalopanax Miquel in Ann. Mus. Bot. Lugd.-Bat. I. 16 (1863), pro parte.—Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 50 (1897), pro parte.

Brassaiopsis Seemann in Jour. Bot. II. 290 (1864), pro parte; non Decaisne & Planchon.
Acanthopanax Bentham & Hooker, Gen. Pl. I. 938 (1867), pro parte; non Miquel.

Miquel's Kalopanax includes species belonging to four distinct genera. His *Kalopanax ricinifolium* is to be considered the type of this genus; his *K. sumatranum* and *K. resectum* belong to the genus Brassaiopsis; his *K. divaricatum* to the genus Acanthopanax, and his *K. innovans* to our new genus Evodiopanax.

Kalopanax ricinifolium Miquel in Ann. Mus. Bot. Lugd.-Bat. I. 16 (1863).—Fr. Schmidt in Mém. Acad. Sci. St. Pétersb. ser. 7, XII. no. II. 140 (Fl. Sachal.) (1868).—Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 51 (1894).—Palibin in Act. Hort. Petrop. XVII. 99 (Consp. Fl. Kor. I.) (1898).—Komarov in Act. Hort. Petrop. XXV. 122 (Fl. Mansh. III.) (1907).—Nakai, Fl. Kor. I. 275 (1909); II. 493 (1911).—Matsumura, Ind. Pl. Jap. II. 420 (1912), pro parte.

Panax ricinifolium Siebold & Zuccarini in Abh. Akad. Muench. IV. pt. II. 199 (Fl. Jap. Fam. Nat. I. 91) (1845).
Brassaiopsis ricinifolia Seemann in Jour. Bot. II. 291 (1864).
Acanthopanax ricinifolium Seemann in Jour. Bot. VI. 140 (1868); Revis. Heder. 86 (1868).—Marchal in Bull. Soc. Bot. Belg. XX. 85 (1881).—Shirasawa, Icon. Ess. For. Jap. II. t. 56, f. 11–24 (1909).—Schneider, Ill. Handb. Laubholzk. II. 429, f. 289 v–z, f. 291 b–c (1909).—Rehder in Bailey, Cycl. Am. Hort. I. 11 (1900); in Bailey, Stand. Cycl. Hort. I. 192, f. 80 (1914).—Bean, Trees & Shrubs Brit. Isles, I. 131 (1916).—Koehne in Mitt. Deutsch. Dendr. Ges. XXII. 145 (1913).
Acanthopanax ricinifolia Franchet & Savatier, Enum. Pl. Jap. I. 193 (1875).
Acanthopanax ricinifolius v. *Maximowiczii* Koehne in Mitt. Deutsch. Dendr. Ges. XXII. 148 (1913), pro parte.—Harms in Mitt. Deutsch. Dendr. Ges. XXVII. 31 (1918), pro parte.

Acanthopanax ricinifolium Decaisne & Planchon apud Lavallée, Arb. Segrez. 126 (1877).—Dippel Handb. Laubholzk. III. 237 (1893).—Schelle in Mitt. Deutsch. Dendr. Ges. XVIII. 289 (1909).

Tetrapanax ricinifolium K. Koch in Wochenschr. Gärtn. Pflanzenk. II. 371 (1859).

Kalopanax ricinifolium α. typicum Nakai.

MANSHURIA: Deaus Dundas, *C. J. Maximowicz.*

KOREA: Jin sen, *T. Uchiyama;* Peuk-tung-dsi, *T. Uchiyama;* Chinnampo, *H. Imai*, no. 117; Koryo, *T. Mori*, no. 31; insula Sajito, *T. Nakai*, no. 9750; Peninsula Kagen, *T. Nakai*, no. 9749; in monte Keiryusan, *T. Nakai*, no. 8106; Seoul, *N. Okada;* in montibus Kongosan, *T. Nakai*, no. 5695; in monte Jyuseizan, *T. Nakai*, no. 2139; insula Hoto, *Y. Hanabusa*; via inter Chuczan et Czaschien, *V. Komarov*, no. 1150; in insula Daikokuzanto, *T. Ishidoya & Chung*, no. 3635; Taiyudo, *E. H. Wilson*, no. 8613; Peuk-han-san, *Sontag;* Gensen, *C. S. Sargent;* in monte Kongosan, *E. H. Wilson*, no. 9242; Chemulpo, *E. H. Wilson*, no. 10554; in monte Hakusan, prov. Keiki, *E. H. Wilson*, no. 10615; Chinnampo. *J. G. Jack*, ibidem, *U. Faurie*, no. 546; in collibus Ouensan, *U. Faurie*, no. 210; Hansan Monastery, *Mills*, no. 340; Genzan, *T. Nakai;* insula Okto, *T. Nakai*, no. 299; Kongosan, *T. Nakai*, no. 5696.

DAGELET: sine loco speciali, *K. Okamoto, E. H. Wilson*, no. 8577; Rarikol, *T. Ishidoya*, no. 103; in monte Jyoho, *T. Nakai.*

QUELPAERT: in monte Hallasan, *T. Nakai*, no. 63, 6362; in silvis, *E. Taquet*, no. 137; Hallaisan, *T. Ishidoya*, near Mushroom House, *E. H. Wilson*, no. 9471.

YESO: Hakodate, prov. Oshima, *Albrecht.*

HONDO: in monte Amagisan, prov. Idzu, *J. Matsumura;* Aidzu, *R. Yatabe* & *J. Matsumura;* in monte Togakushi, prov. Shinano, *J. Matsumura;* Konodai, prov. Shimousa, *J. Matsumura;* Omiya, prov. Musashi, (*coll.* ?); Okunimoto, prov. Uzen, (*coll.* ?).

KYUSHU: Nagasaki, prov. Hizen, *R. Oldham.*

CHINA: Tsi-Yiian Hsien, prov. Honan, *J. Hers*, no. 1779; Tien Tai, prov. Chekiang, *J. Hers*, no. 252.

Kalopanax ricinifolum var. **magnificum** Zabel in Gartenwelt, XI. 535, fig. p. 539 (1907).—Koehne in Mitt. Deutsch. Dendr. Ges. XXII. 150 (1913).—Harms in Mitt. Deutsch. Dendr. Ges. XXVII. 32, t. 5 g–o, t. 86 (1918).

Acanthopanax acerifolium Schelle in Mitt. Deutsch. Dendr. Ges. XVII. 212 (1908).

Kalopanax ricinifolium Matsumura, Ind. Pl. Jap. II. 2, 420 (1912), pro parte.

Folia subtus pilis simplicibus elongatis crispis v. multifidis plus minus lanata, ad medium late 5–7-fida.

YESO: sine loco speciali, *L. Boehmer;* Horoidzumi, prov. Hidaka, *Y. Tokubuchi;* Nanai, *C. S. Sargent;* Sapporo, *J. G. Jack*, ibidem, *S. Arimoto.*

HONDO: in monte Tsukuba, prov. Hitachi, *H. Sakurai;* Nikko, prov. Shimotsuke, *J. Matsumura;* in monte Ontake, prov. Shinano, *J. Matsumura;* in monte Komagatake, prov. Shinano, *R. Yatabe & J. Matsumura;*

Yumoto, prov. Shimotsuke, *E. H. Wilson*, no. 6760; Nasu, prov. Shimotsuke, *H. Sakurai;* Kakidao, prov. Suwo, *J. Nikai*, no. 730.

KOREA: Koryo, *T. Nakai.*

CHINA: prope Chang-hua, prov. Chekiang, *F. N. Meyer*, no. 1556.

Kalopanax ricinifolium var. **Maximowiczii** Nakai, comb. nov.

Aralia Maximowiczii Van Houtte in Fl. des Serr. xx. 39, t. 2067–2068 (1874). *Acanthopanax ricinifolius* var. *Maximowiczii* Schneider, Ill. Handb. Laubholzk. II. 429, fig. 291 d (1909).—Beissner in Mitt. Deutsch. Dendr. Ges. XVIII. 290 (1909).—Koehne in Mitt. Deutsch. Dendr. Ges. XXII. 149 (1913), pro parte.—Bean, Trees & Shrubs Brit. Isles, 131 (1916).—Harms in Mitt. Deutsch. Dendr. Ges. XXVII. 31, t. 5, fig. e, f, t. 7, 8 (1918), pro parte.

Folia ramorum floriferorum anguste profunde laciniata, subtus plus minus canescentia.

YESO: sine loco speciali, *R. Yatabe.*

HONDO: Fukushima, prov. Shinano, *C. S. Sargent;* monte Ontake, prov. Shinano, *G. Koidzumi;* monte Togakushi, prov. Shinano, *H. Sakurai.*

CHINA: prov. Honan, *J. Hers*, no. 29.

Kalopanax ricinifolium var. **lutchuense** Nakai, var. nov.

Folia glabra, omnia 9-costata lobis ovato-attenuatis.

LIUKIU: insula Okinawa, *Y. Tashiro, J. Matsumura, T. Miyagi.*

Kalopanax ricinifolium var. **chinense** Nakai, var. nov.

Acanthopanax ricinifolium Harms & Rehder in Sargent, Pl. Wilson. II. 559 (1916).—Harms in Mitt. Deutsch. Dendr. Ges. XXVII. t. 5, fig. A–D (1918).

Folia breviter lobata. Inflorescentia minus decomposita.

CHINA: Hupeh occid., *E. H. Wilson*, no. 602; Hsing-shan Hsien, prov. Hupeh, *E. H. Wilson*, no. 602; prope Washan, *E. H. Wilson*, no. 1962; Ichang, *E. H. Wilson*, no. 1963; Fupe, *C. Silvestri;* Yunnan, *G. Forrest*, no. 11505, 11256; in silva infra vicum Tungdjiapai prope minas Hsikwangshan, prov. Hunan, *H. Handel-Mazzetti*, no. 2020; prope Langtai Ting, prov. Kweichau, *C. Schoch*, no. 408; Ningpo Mts., *E. Faber*, no. 44.

Koehne made a thorough study of this species from plants cultivated in Germany and published the results in Mitteilungen der Deutschen Dendrologischen Gesellschaft no. 22 (1913). He stated that there are three distinct forms: 1) those having leaves shallowly cleft remaining unchanged through the age of the tree; 2) those having leaves deeply and narrowly cleft when young but shallowly cleft when old; 3) those having leaves shallowly cleft when young but deeply and narrowly cleft when old. As Siebold's specimens kept in the herbarium of the university of Leyden have the leaves lobed in various forms he took var. *Maximowiczii* Schneider as the name for his second and third group, and var. *magnificum* Zabel for his first group. His classification is principally based upon the plants cultivated in Germany and he paid no attention to the pubescence of leaves which is a marked characteristic of the species. There are many intermediate forms in Japan and it is hard to draw any definite distinctions.

1. Leaves always shallowly lobed and sparsely hairy.

2. Leaves sparsely hairy when mature, deeply lobed on young but shallowly lobed on mature trees.

3. Leaves always shallowly lobed and densely hairy.

4. Leaves always deeply lobed and densely hairy.

5. Leaves shallowly lobed and sparsely hairy on young, deeply lobed and densely hairy on mature trees.

By Siebold (Florae Japonicae Familiae naturales, n. 410 [1846]) the species was described as with "foliis alternis longe petiolatis e basi subcordata vel truncata orbicularibus profunde palmato-quinquefidis, lobis oblongis acuminatis argute serratis glabris coriaceis," and further in the detailed notes below he makes the following statement: "lamina basi subcordata, rotundata vel truncata, orbicularia, ad medium circiter usque palmato-quinqueloba lobis oblongis acuminatis lateralibus parum brevioribus, utrinque glabra subtus dense reticulato-venosa."

Thus we readily see that our first and second groups correspond to Siebold's *Panax ricinifolium*, though the specimens at Leyden show a variety of forms. Our first and second groups should therefore be named var. *typicum*. The third is *Acanthopanax ricinifolium* var. *magnificum* or *Acanthopanax acerifolium* Schelle. The fourth and the fifth are *Aralia Maximowiczii* Van Houtte. The first group is found in Hondo; the second is distributed through Hondo, Korea, Quelpaert, Manchuria, Ussuri and China; the third is distributed in Yeso, Hondo, Korea and China; the fourth and fifth are in Yeso, Hondo and China. Koehne says, "Blühende Zweige mit tief geteilten Blättern sind noch nicht bekannt geworden" thus flowers of var. *Maximowiczii* have not been seen in Germany. But we have a flowering specimen of the variety collected in the province of Shinano and I myself have seen the same type not rarely in the mountains of the province of Kai. Therefore this should be the type of a distinct variety. In the Arnold Arboretum there is growing a tree of this variety which was introduced from France. It is now of good size but has not yet flowered. There are also in this Arboretum three large trees of this species raised from seed collected by Professor Sargent in Yeso. They correspond to our third type. Another tree raised from seed collected by Mr. J. G. Jack in Yeso in 1905 is also of the third type, yet it is less hairy.

The Liukiu type which is just like the figure a of Koehne and as Tafel 5, fig. A of Harms has leaves whose main ribs approximately radiate from the base of the leaves, but the leaves are always 9-lobed. In general the leaves of the flowering branches of this species are 5–7 ribbed. The Chinese plants which have very short lobes belong to var. *chinense*.

Echinopanax Dcne. & Planch.

Echinopanax Decaisne & Planchon in Rev. Hort., 1854, 105.—Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 34 (1894).—Schneider, Ill. Handb. Laubholzk. II. 429 (1909).

Panax 2. *Oplopanax* Torrey & Gray, Fl. North America I. 648 (1840).
Horsfieldia Seemann in Jour. Bot. v. 237 (1867), non Blume.[1]
Oplopanax Miquel in Ann. Mus. Lugd.-Bat. I. 16 (1863).
Panax De Candolle, Prodr. IV. 252 (1830).—G. Don, Gen. Syst. III. 384 (1834), pro parte.
Fatsia Bentham & Hooker, Gen. Pl. I. 3, 937 (1867), pro parte.

Folia saepe peltata grosse inciso-serrata. Flores racemosi; calycis dentes subnulli ..... *E. japonicum*

Folia nunquam peltata minute serrulata. Flores stricte umbellati; calycis dentes saepe evoluti ..... *E. elatum.*

Echinopanax japonicum Nakai, sp. nov.

Oplopanax horridum Torrey & Gray apud Miquel in Ann. Mus. Bot. Lugd.-Bat. I. 16 (1863); non *Panax horridum* Torr. & Gr.
Aralia Laribuki Keiske herb. ex Miquel, l. c. (1863), pro synon.
Aralia Faribuki Siebold herb. ex Miquel, l. c. (1863), pro synon.
Horsfieldia horrida Seemann in Jour. Bot. v. 237 (1867); Rev. Gatt. Heder. 86 (1868), quoad specimina e Japonia.
Fatsia horrida Bentham & Hooker, Gen. Pl. I. 939.—Dippel, Handb. Laubholzk. III. 238 (1893), quoad plantam Japonicam.
Fatsia horrida Franchet & Savatier, Enum. Pl. Jap. I. 194 (1875).
Echinopanax horridum Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 34 (1894); Mitt. Deutsch. Dendr. Ges. XXVII. 34 (1918), quoad plantam Japonicam.—Schneider, Ill. Handb. II. 430, fig. 291, g (1909), quoad plantam Japonicam.—Matsumura, Ind. Pl. Jap. II. 418 (1912).

Affine E. horrido sed exquo foliis grossius incisis longe acuminatis, spinis rigidioribus, inflorescentia nunquam barbata statim dignoscendum.

Frutex; caulis densissime aculeatus. Folia longe petiolata; petioli dense hispidi; lamina palmatifida, lobis inciso-laciniatis, supra viridia, ad venas aciculata, infra pilosa et ad venas aciculati, basi cordata saepe peltata. Flores racemoso-decompositi; pedunculi et pedicelli pilosi saepe aciculati; calycis lobi obsoleti; petala viridescentia. Bacca 6 mm. longa, rubra, stylis 2-fidis persistentibus coronata.

YESO: Esashi, *K. Miyabe & Y. Tokubuchi;* sine loco speciali, *L. Boehmer;* Hakodate, *C. Wright.*

HONDO: monte Iwatesan, *G. Nakahara*; monte Iwakisan, *H. Sakurai;* Nikko, *J. Matsumura;* ibidem, *H. Sakurai;* monte Bandaisan, *R. Yatabe & J. Matsumura;* monte Hakusan, *R. Yatabe & J. Matsumura;* ibidem, *J. Nikai*, no. 1981; Ibidem, *H. Sakurai;* monte Gassan, *S. Okubo;* monte Ontake, *J. Matsumura;* ibidem, *G. Koidzumi;* monte Yatsugatake, *H. Sakurai;* monte Iidesan, *K. Nemoto;* monte Hakkodasan, *U. Faurie*, no. 6235; ibidem, *E. H. Wilson*, no. 7097; Yumoto in Nikko, *E. H. Wilson*, no. 6834; Nippon media et Nambu, *Tschonoski.*

Echinopanax elatum Nakai, Fl. Kor. I. 276, t. 15 (1909); Veg. Diamond Mts. 180 (1918).

Echinopanax horridum Komarov in Act. Hort. Petrop. XXV. 119 (Fl. Mansh. III.) (1909).—Harms in Mitt. Deutsch. Dendr. Ges. XXVII. 34 (1918), pro parte.

KOREA: Hotaisan, *M. Furumi*, no. 247; monte Rorinsan, *T. Mori;* monte Chiisan, *T. Nakai;* Diamond Mts., *T. Nakai*, no. 5697, *T. Uchi*

[1] Horsfieldia contains only *H. aculeata* Blume which has peltate leaves with dense stellate hairs and paleaceous fruits.

yama; monte Gatokurei, *T. Nakai*, no. 2140; Abuzsa-kozar, *V. Komarov*, no. 1147; Diamond Mts., *E. H. Wilson*, no. 10486; Tokujitsuri, prov. Kankyo austr., *E. H. Wilson*, no. 9152; monte Setsurei, *E. H. Wilson*, no. 9033.

Fatsia Dene. & Planch.

Fatsia Decaisne & Planchon in Rev. Hort. 1854, 405.—Miquel in Ann. Mus. Bot. Lugd.-Bat. I. 11 (1863).—Seemann in Jour. Bot. III. 176 (1865).—K. Koch, Dendr. I. 677 (1869).—Bentham & Hooker, Gen. Pl. I. 3, 939 (1867), pro parte.—Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 33 (1894).

Aralia De Candolle, Prodr. IV. 257 (1830), pro parte.—G. Don, Gen. Syst. III. 388 (1834), pro parte.

Fatsia japonica (Thunberg) Decaisne & Planchon in Rev. Hort. 1854, 405.—Miquel in Ann. Mus. Bot. Lugd.-Bat. I. 11 (1863).—Seemann in Jour. Bot. III. 176 (1865).—Bentham & Hooker, Gen. Pl. I. 939 (1867), pro parte.—K. Koch, Dendr. I. 677 (1869).—Franchet & Savatier, Enum. Pl. Jap. I. 194 (1875).—Lavallée, Arb. Segrez. 126 (1877).—Lauche, Deutsch. Dendr. 307, fig. 206 (1880).—Dippel, Handb. Laubholzk. III. 239 (1893).—Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 33 (1894).—Ito & Matsumura in Jour. Coll. Sci. Tokyo, XII. 535 (1899).—Miller in Bailey, Cycl. Am. Hort. II. 571 (1901).—Matsumura, Ind. Pl. Jap. II. 419 (1912).—Rolfe in Bot. Mag. CXLI. t. 8638 (1915).—Bean, Trees & Shrubs Brit. Isles I. 554 (1916).

Aralia japonica Thunberg, Fl. Jap. 128 (1784).—Willdenow, Spec. I. 1519 (1797).—Sprengel, Syst. Veg. I. 951 (1825).—De Candolle, Prodr. IV. 258 (1830).—G. Don, Gen. Syst. III. 389 (1834).

Aralia Sieboldii hort. ex K. Koch in Wochenschr. Gärtn. Pflanzenk. II. 407 (1859), pro synon.

HONDO: Tokyo, *T. Makino;* Misaki, prov. Sagami, *T. Nakai;* Enoshima, prov. Sagami, *T. Nakai;* Oiso, prov. Sagami, *H. Sakurai.*

KYUSHU: in insula Yakushima, *E. H. Wilson*, no. 6073; sine loco speciali, *C. Wright;* Nagasaki, *R. Oldham;* ibidem, *J. Maximowicz.*

TSUSHIMA: in rupibus Idzuhara, *T. Nakai;* ibidem, *Y. Yabe.*

LIUKIU: Kunchan insulae Okinawa, *Y. Tashiro;* in monte Ubachimata insulae Okinawa, *J. Matsumura.*

There are many garden forms which often mutate from the type and whose characters are hardly inheritable.

Fatsia japonica f. variegata.

Aralia Sieboldii variegata Veitch in Proc. Roy. Hort. Soc. I. 577 (1861).

Folia varie albo-variegata.

Fatsia japonica f. albo-marginata.

Fatsia japonica var. *albo-marginata* Lavallée, Arb. Segrez. 126 (1877), nomen nud.

Folia margine alba.

Fatsia japonica f. aureo-variegata.
Fatsia japonica var. *aureo-variegata* Lavallée l. c. (1877), nomen nud.
Folia aureo-variegata.

Fatsia japonica f. aureo-reticulata.
Fatsia japonica var. *aureo-reticulata* Verschaffelt apud André in Ill. Hort. XVII. 116, t. 22 (1870).—Lavallée, Arb. Segrez. 126 (1877).
Aralia japonica variegata Mouillefert, Arb. Arbriss. II. 879 (1896).
Folia aureo-reticulata.

Fatsia japonica f. undulata.
Fatsia japonica var. *undulata* Lavallée, Arb. Segrez. 126 (1877), nomen nud.
Folia margine eximie undulata, interdum subcrispa.

Fatsia japonica f. lobulata.
Fatsia japonica var. *lobulata* Makino in Jour. Jap. Bot. I. 3, 10 (1916).
Lobi foliorum lobulati.

Boninofatsia Nakai

Boninofatsia Nakai, gen. nov.

Differt a Fatsia quacum adhuc confusa filamentis complanatis, connectivo producto, pyrenis crustaceis, albumine ruminato.

Arboreus; caulis solitarius apice ramosus. Folia exstipulata petiolata biennia palmatifida serrulata v. integra. Umbellae paniculatae, ramis et bracteis articulatis; pedicelli elongati cum floribus inarticulati; calycis lobi nulli; petala 5 aestivatione valvata; stamina 5; filamenta plana; connectivum bene evolutum apice productum. Discum plus minus evolutum; styli 5 liberi; ovarium 5-loculare; ovula in loculis solitaria; bacca nigra; pyrenae 5 crustaceae. Albumen ruminatum.—Species duae in Bonin incolae.

Pedicelli 2–3 cm. longi.....*B. oligocarpella.*
Pedicelli 1 cm. longi.....*B. Wilsonii.*

Boninofatsia oligocarpella Nakai, comb. nov.
Fatsia oligocarpella Koidzumi in Tokyo Bot. Mag. XXXII. 136 (1918).

BONIN: in monte Kuwanokiyama insulae Habajima, *S. Nishimura;* ibidem, *T. Nakai;* in silvis montis Sekimonyama insulae Hahajima, *T. Nakai;* in insula Kita-iwo, *T. Nakai.*

Boninofatsia Wilsonii Nakai, sp. nov.
Fatsia oligocarpella Wilson in Jour. Arn. Arb. I. 109 (1919); non Koidzumi.

Arborea gracilis 7–8 m. alta; rami glabri. Petioli 3–20 cm. longi, glaberrimi, teretes, basi dilatati, amplexicaules; lamina foliorum 8–19 cm. longa, 9–26 cm. lata, 3–7-lobata, glaberrima, lobis ovatis v. obovatis v. oblongis, supra lucida infra pallida et costis valde elevatis, margine integerrima sed repanda. Umbellae paniculatae. Infructescentia usque 16 cm. longa; axis albo-flosculosa; pedicelli 1 cm. longi, fere glabri; bacca 7–9 cm. longa, oblonga, nigra, stylis 5 liberis persistentibus coronata. Pyrenae crustaceae. Albumen ruminatum.

BONIN: Chichijma, in silvis, *E. H. Wilson*, no. 8250, April 22, 1917; Chichijima, *H. Otomo*, May 4, 1917.

Diplofatsia Nakai

Diplofatsia Nakai, gen. nov.

Folia exstipulata, longe petiolata, biennia, palmatifida, lobis serratis. Umbellae paniculatae rufo-barbatae; bracteae magnae, caducae, rufo-barbatae; pedicelli rufo-barbati, apice articulati; calycis lobi desunt; petala 5 valvata; stamina 5; connectivum parvum; discus convexus; ovarium 10-(8–11) loculare; styli 10 (8–11) distincti.—Species 1 in Formosa indigena.

Diplofatsia polycarpa Nakai, comb. nov.

Fatsia polycarpa Hayata in Jour. Coll. Sci. Tokyo, XXV. art. XIX. 105, t. 8 (Fl. Mont. Formos.) (1908); Icon Pl. Formos. II. 59 (1912).—Kanehira, Formos. Trees, 275 (1917).

FORMOSA: monte Morrison 2300 m., *T. Kawakami* et *U. Mori*, no. 1568; Arisan, prov. Kagi, 500–2500 m., *E. H. Wilson*, nos. 9756, 10859.

The smooth naked calyx is articulated with the rusty-haired pedicel and the tomentum being conspicuous especially at its end, the separation between the calyx and pedicel is very marked.

Tetrapanax K. Koch

Tetrapanax K. Koch in Wochenschr. Gärtn. Pflanzenk. II. 371 (1859).—G. Bennett in Jour. Bot. II. 309 (1864).—Seemann in Jour. Bot. VI. 57 (1868).—Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 33 (1894).

Fatsia Bentham & Hooker, Gen. Pl. I. 939 (1867), pro parte.

Tetrapanax papyriferum K. Koch in Wochenschr. Gärtn. Pflanzenk. II. 371 (1859).—Bennett in Jour. Bot. II. 309 (1864).—Seemann in Jour. Bot. VI. 58 (1868), "T. papyrifera."—Harms in Engler & Prantl, Nat. Pflanzenfam. III. 8, 34 (1894), "T. papyrifer."

Aralia ? papyrifera Hooker in Hooker's Jour. Bot. Kew Gard. Misc. IV. 53, t. 1, 2 (1852).—Planchon in Fl. des Serr. VIII. 153, t. 806–807 (1853); XII. 37, t. 1201 (1857).

Aralia papyrifera Hooker in Bot. Mag. LXXXII. t. 4897 (1856).

Fatsia papyrifera Forbes & Hemsley in Jour. Linn. Soc. XXIII. 341 (1888).—Miller in Bailey, Cyclop. Am. Hort. II. 57 (1901); in Bailey, Stand. Cyclop. Hort. 1204 (1915).—Matsumura & Hayata, Enum. Pl. Formos. 177 (1906).—Léveillé, Cat. Pl. Yunnan, 11 (1915).

LIUKIU: in page Mizato insulae Okinawa, *J. Matsumura*.

FORMOSA: Suitenryo, *B. Hayata;* Kelung, *T. Makino;* Arisan, prov. Kagi, alt. 2000 m. *E. H. Wilson;* pede montis Taihei, prov. Giran, alt. 666 m. *E. H. Wilson*, no. 10131; sine loco speciali, *R. Oldham*, no. 198.

CHINA: Yunnan, in silvis, *A. Henry*, no. 11358; Hunan, prope urbem Tschangscha, *H. Handel-Mazzetti*, no. 459; Hupeh, *A. Henry*, no. 7763.

Oreopanax Dcne. & Planch.

Oreopanax Decaisne & Planchon in Rev. Hort. 1854, 107.—Miquel in Ann. Mus. Bot. Lugd.-Bat. I. 26 (1863).—Seemann in Jour. Bot. III. 270 (1865).—Bentham & Hooker, Gen. Pl. I. 946 (1867).—Marchal in Martius, Fl. Brasil. XI. 251 (1878).—Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 40 (1894).

Oreopanax formosanum Hayata in Jour. Coll. Sci. Tokyo, XXV. art. XIX. 108, pl. 14 (Fl. Mont. Formos.) (1908); Icon. Pl. Formos. II. 61 (1912).—Kanehira, Formos. Trees, 280 (1917).

FORMOSA: in monte Arisan, *G. Nakahara;* in monte Niitakayama, *T. Kawakami* et *U. Mori*, no. 1871 et 1709; in monte Arisan, *E. H. Wilson*, no. 9734.

According to S. Sasaki, collector for the Formosan Government, this plant usually grows on dry highlands from 2500–3000 m. above sea-level but sometimes as low as 2000 m. altitude, but on Mt. Daibusan of South Formosa it grows in the woods at about 1000 m. above sea-level. Its trunk attains a height of 10–12 m. and a diameter of about 35–38 cm. The bark is grayish white and has longitudinal cleavages; the pith is large. The manner of branching somewhat resembles that of *Firmiana simplex* W. F. Wight; the leaves are evergreen.

Agalma Miq.

Agalma Miquel,[1] Fl. Ned. Ind. I. 752, t. 11 (1855).—Seemann in Jour. Bot. II. 290, 296 (1864); VI. 164 (1868).

Heptapleurum Bentham & Hooker, Gen. Pl. I. 942 (1867); non Gaertner.

Heptapleurum subgen. *Agalma*, C. B. Clarke in Hooker, Fl. Brit. Ind. II. 728 (1879), forsan pro parte.

Schefflera Sect. *Agalma* Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 38 (1894).

Paratropia Bentham, Fl. Hongk. 136 (1861); non A. P. de Candolle.

Arbores pleraeque terrestres. Folia alterna, digitata, foliolis petiolulatis. Inflorescentia racemoso-decomposita; calycis tubus ovario adnatus, limbus 5–6 dentibus persistentibus; petala 5–6, ovato-oblonga, aestivatione valvata, apice incurva; stamina 5–6; styli breve v. longe columnares; ovarium 5–6-loculare; drupa stylo persistente rostrata, 5–6-angulata; pyrenae subchartaceae.—Species circiter 20 in Formosa, Liukiu, China austr., Ins. Philipp., Borneo, Cochinchina, Malaya, Java, Sumatra, India orient. et Ceylon.

Agalma taiwanianum Nakai, sp. nov.

Heptapleurum racemosum Hayata in Tokyo Bot. Mag. XX. 53 (1906); in Jour. Coll. Sci. Tokyo XXV. art. XIX, 107 (Fl. Mont. Formos.) (1908); Icon. Pl. Formos. II. 60 (1912).—Kanehira, Formos. Trees, 279 (1917).—Non Beddome.

Schefflera racemosa Matsumura, Ind. Pl. Jap. II. 2, 422 (1912), excl. syn.; non Harms.

[1] Agalma DC. is cited erroneously by Steudel (Nomencl. ed. 2, 33 [1841]) as a generic name, though De Candolle (Prodr. VII. 250 [1838]) had proposed it as a sectional name of Mulgedium.

Differt a *H. racemoso* quocum adhuc confusum foliis saepe octomeris, axi inflorescentiae elongata racemosa et ramis brevibus circa basin axeos congestis, floribus hexameris.

Arborea; rami robusti glabri, cicatribus foliorum conspicuis; medulla lamellata alba. Petioli basi dilatati subamplexicaules, elongati, 9–25 cm. longi, glabri; lamina digitatim 5–9 (vulgo 7–9)-foliolata; foliola petiolulis 5–20 mm. longis, oblanceolata, basi acuminata, apice caudato-attenuata, supra glabra lucida, infra glaucina vel glauca, glabra; inflorescentia in apice rami hornotini terminales 20–30 cm. longa, racemosa basi ramis brevibus decomposita, initio minute stellulata sed mox glabrescens. Bracteae 4–8 mm. longae, ovatae; bracteolae minimae vix 1 mm. longae; pedicelli saepe deflexi, 4–6 mm. longi; calycis tubus obovato-turbinatus, glaber, 2 mm. longus, stellulato-ciliatus; limbus brevis, obsolete 6-dentatus; petala 6, 2 mm. longa, elongato-triangularia, intus costata, apice unguiculata; stamina 6, petalis longiora; antherae rotundatae biloculares. Connectivum punctatum, non productum. Styli in columnam unicam connati, 0.5–0.8 mm. longi; stigma obsolete 6-lobatum; ovarium 6-loculare. Fructus 5–7 mm. longi, sphaerici, apice in stylos persistentes circiter 2 mm. longos rostrati.

FORMOSA: in monte Niitakayama, alt. 2000 m., *T. Kawakami* et *U. Mori*, no. 1705; Tozan, *G. Nakahara;* in monte Arisan, *G. Nakahara;* ibidem, *E. H. Wilson*, nos. 9733, 10811.

Agalma lutchuense Nakai, sp. nov.

Schefflera octophylla Ito & Matsumura in Jour. Coll. Sci. Tokyo, XII. 537 (1899).—Matsumura, Ind. Pl. Jap. II. 2, 422 (1912).—Non Harms.

Heptapleurum octophyllum Forbes & Hemsley in Jour. Linn. Soc. XXIII. 342 (1888), quoad pl. e Lutchu.—Henry in Trans. As. Soc. Jap. XXIV. suppl. 88 (List Pl. Formos.) (1896), pro parte.—Matsumura & Hayata in Jour. Coll. Sci. Tokyo, XXII. 178 (Enum. Pl. Formos.) (1906).—Hayata in Jour. Coll. Sci. Tokyo, XXV. art. IX. 107 (Fl. Mont. Formos.) (1908), pro parte; Icon. Pl. Formos. II. 60 (1912).—Kanehira, Formos. Trees, 278 (1917).—Non Hance.

Differt ab *Agalmate octophyllo* Seemann quocum adhuc confusum, foliis et inflorescentia rufescenti-stellulatis, foliolis 7–10 (non 5–8), paniculis dilatatis.

Arbor magna; truncus diametro usque 1 m.; cortex fuscescens; rami robusti lucidi; medulla solida. Petioli 10–15 cm. longi, basi dilatati amplexicaules, glabri; foliola 7–11 (vulgo 8–11), omnia longe petiolulata, oblanceolata vel lineari-oblonga vel elliptica, integra rarius sinuata, basi acuta vel attenuata apice acuminatissima, supra primo sparsim minute stellulata sed glabrescentia, opaca, subtus rufescenti-stellulata, 3–25 cm. longa, rosularum saepe paucidentata vel sinuata; petioluli 1–11 cm. longi. Panicula ampla 10–25 cm. longa, ambitu rotundata, dense stellulata, ramis inferioribus longioribus; calycis tubus obovatus sparsim stellulatus 1.5 mm. longus, limbus brevissimus obsolete 5-dentatus; petala 5, viridia, patentia, 2 mm. longa, triangularia, intus supra medium costata, apice unguiculata; stamina 5, patentia, 5 mm. longa; antherae subrotundae;

discum in stylum brevem sensim elevatum; stigma obscure 5-lobum; ovaria 5-(rarissime 6)-locularia. Bacca atropurpurea sphaerica, 4–6 mm. longa.

LIUKIU: Nase insulae Oshima, *T. Uchiyama;* ibidem, *E. H. Wilson*, no. 8016; Kumage insulae Tanegashima, *S. Tanaka;* in monte Ubashimata insulae Okinawa, *J. Matsumura;* insula Okinawa, *T. Miyagi*, sine loco speciali, *C. Wright*, no. 101.

FORMOSA: Kelung, *T. Makino;* Horisha, *K. Miyake;* Tamsui, *A. Henry*. no. 1780, 1735a; Bankinsing, *A. Henry*, no. 57; Taihoku, *E. H. Wilson*, no, 10269; Tamsuy, *R. Oldham*, no. 199.

KYUSHU: prov. Osumi (*coll.* ?); Idzumimura, prov. Satsuma, *Z. Tashiro;* insula Yakushima, *E. H. Wilson*, no. 6108.

Heptapleurum Gaertn.

Heptapleurum Gaertner, Fruct. Sem. II. 472, t. 178, t. 1 (1791).—Seemann in Jour. Bot. II. 297, in nota sub. gen. Agalmate (1864); III. 75 (1865); VI. 164 (1868).—Bentham & Hooker, Gen. Pl. I. 942 (1867), pro parte.

Aralia sect. *Paratropia* Blume, Bijidr. 873 (1826).

Heptapleurum subgen. *Eu-Heptapleurum* C. B. Clarke in Hooker, Fl. Brit. Ind. II. 729 (1879).

Paratropia De Candolle, Prodr. IV. 265 (1830).—Wight & Arnott, Prodr. Fl. Ind. Or. I. 377 (1831).—G. Don, Gen. Syst. III. 395 (1834).—Endlicher, Gen. Pl. 795 (1836–40).—Miquel, Fl. Ind. Bat. I. 752 (1855); in Ann. Mus. Bot. Lugd.-Bat. I. 19 (1863).

Schefflera Sect. *Heptapleurum* Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 38 (1894).

Arbusculae epiphyticae plus minus scandentes. Folia alterna, digitata. Umbellae racemosae vel paniculatae; calycis limbus brevissimus, subtruncatus, 5–7 (8–12)-dentatus; petala 5–7 (8–12), aestivatione valvata, caduca, vulgo purpurea vel sanguinea; stamina 5–7 (8–12); filamenta subulata vel subfiliformia; antherae rotundatae; connectivum parvum, non productum; styli nulli; stigmata in disco immersa, persistentia; ovarium 5–7-loculare. Drupae maturae subsiccae angulato-sulcatae; pyrenae chartaceae.—Circiter 40 species in Asia trop. et insulis Pacificis.

Heptapleurum arboricolum Hayata, Icon. Pl. Form. VI. 23 (1916).

Heptapleurum octophyllum A. Henry in Trans. As. Soc. Jap. XXIV. suppl. 48 (List Pl. Formos.) (1896), pro parte.—Hayata in Jour. Coll. Sci. Tokyo, XXV. art. IX. 107 (Fl. Mont. Formos.) (1908), pro parte.—Non Hance.

Schefflera arboricola Hayata, Icon. Pl. Formos. VI. 23 (1916), pro syn.

FORMOSA: in monte Kakubansan, *S. Sasaki;* Shisangan, *T. Makino;* in monte Niitakayama 3000 m., *T. Kawakami* et *U. Mori*, no. 1899; South Cape, *A. Henry*, no. 297, 1358, 1358A; Bankinsing, *A. Henry*, no. 1718; Kuram, prov. Koshun, *E. H. Wilson*, no. 11027; circa Keitoa, prov. Nanto, *E. H. Wilson*, no. 9828.

Boerlagiodendron Harms

Boerlagiodendron Harms in Engler & Prantl, Nat. Pflanzenfam. III. art. 8, 31 (1894).

Genus eximie polymorphum forsan in plura genera dividendum.

Boerlagiodendron kotoense Nakai, comb. nov.

Osmoxylon kotoensis Hayata, Icon. Pl. Form. VI. suppl. 33 (1917), nom. nud.
Boerlagiodendron pectinatum Hayata, Icon. Pl. Formos. X. 27 (1920), non Merrill.

Differt a *Boerlagiodendron pectinato* Merrill quocum adhuc confusum cristulis non pectinatis sed barbatis, floribus ramorum lateralium pedicellatis.

Arbor; rami robusti glabri. Folia longe petiolata; petioli teretes basi distincte ligulati et cristulis longe barbatis tribus instructi, barbis 1.0–1.5 cm. longis; lamina ad medium palmatim 5-loba, basi integra rotundato-mucronata, lobis elliptico-lanceolatis grosse crenato-serratis, supra viridia lucida, infra pallida. Umbellae terminales breviter pedunculatae, bracteis ovatis acuminatis; radii 4-fidi; rami mediani in nostris speciminibus decidui, laterales 4 cm. longi, medio 2-bracteolati; pedicelli 3–6 mm. longi; calycis limbus nullus. Fructus 5-sulcatus; stigma depresso-capitatum.

FORMOSA: insula Kotosho vel Botel-Tobago, *T. Kawakami & S. Sasaki*, no. 59.

According to Mr. Sasaki this tree grows in wet shady places on the island of Botel-Tobago. It is about 7 m. high and its trunk is almost 10–12 cm. in diameter; the branches are scanty.

Gilibertia Ruiz & Pav.

Gilibertia Ruiz & Pavon, Fl. Peruv. Chil. Prodr. 50, t. 8 (1794); ed. 2, 40, t. 8 (1797).—De Candolle, Prodr. IV. 255 (1830).—G. Don, Gen. Syst. III. 387 (1834).—Endlicher, Gen. Pl. 794 (1836–40).—Miquel in Ann. Mus. Bot. Lugd.-Bat. I. 3 (1863).—Bentham & Hooker, Gen. Pl. I. 944 (1867).—Marchal in Martius, Fl. Brasil. XI. pt. I. 246 (1878).—Harms in Engler & Prantl, Nat. Pflanzen fam. III. abt. 8, 40 (1894). Non J. F. Gmelin.[1]

Dendropanax Decaisne & Planchon in Rev. Hort. 1854, 107.—Miquel in Ann. Mus. Bot. Lugd.-Bat. I. 3, 26 (1863).—Seemann in Jour. Bot. II. 299 (1864); Rev. Heder. 27 (1868).—Bentham & Hooker, Gen. Pl. I. 943 (1876).
Textoria Miquel in Ann. Mus. Bot. Lugd.-Bat. I. 3, 12 (1863).

Sect. I. EUGILIBERTIA Nakai.

Umbellae decompositae. Flores 6–8-meri.

Sect. II. DENDROPANAX Nakai.

Umbellae decompositae. Flores 5-meri.

Sect. III. TEXTORIA Nakai.

Umbellae simplices vel basi tantum ramosae. Flores 5-meri. Species Asiaticae omnes huc ducendae.

Gilibertia morbifera Nakai, comb. nov.

Dendropanax morbiferum Léveillé in Fedde, Rep. Spec. Nov. VIII. 493 (1910).

[1] Gilibertia J. G. Gmelin (Syst. Nat. II. 682 (1791)) is a synonym of the older and valid generic name Quivisia Cavanilles.

Arbor magna usque 15 m. alta, ramosa; truncus cinereus, diametro usque ad 8 dm.; rami hornotini robusti, lucidi, virides. Folia lucida, petiolis 1–13 cm. longis supra planis v. subcanaliculatis, laminis ovatis vel oblongis, rosularum trifidis, integris sed repandulis basi subtrinerviis usque ad 20 cm. longis 10 cm. latis. Umbellae terminales, vulgo simplices; pedunculi 3–5 cm. longi; pedicelli 5–10 cm. longi. Fructus ellipsoideus vel late ellipsoideus, maturus niger, 7–10 mm. longus, stylo columnari apice 5-lobulato persistente 1.5–2.0 mm. longo coronatus.

QUELPAERT: between Saishu and monastery, *E. H. Wilson*, no. 9443; secus torrentes, *U. Faurie*, no. 547; in silvis Hallasan, 600 m., *E. Taquet*, no. 4463, 2920; in silvis Hongno, *E. Taquet*, no. 180, *U. Faurie*, no. 1660; *T. Nakai*, no. 848; in silvis, *T. Nakai*, no. 6360, 6359; *T. Ishidoya*, no. 272; in silvis, *E. Taquet*, no. 895, 896.

KOREA: in silvis Choto, *T. Nakai*, no. 9643; in monte Mongansan insulae Daikokuzanto, *T. Ishidoya*, no. 3642; in insula Okto, *T. Nakai*.

This species is the plant from which the Korean yellow lacquer is obtained. The Koreans ruthlessly slit every trunk which they find in the woods to cause the lacquer to secrete. The lacquer is insoluble in water and never deteriorates if kept therein. The yellow furniture seen in Korean shops is lacquered with it. *Gilibertia trifida*, the Japanese species, is similar in its appearance, but the resin found within the bark is colorless. It is of smaller size than the Korean species, and its fruit is spherical.

Gilibertia trifida Makino in Tokyo Bot. Mag. xv. 91 (1901).—Matsumura Ind. Pl. Jap. II. pt. 2, 419 (1912).

Acer trifidum Thunberg, Fl. Jap. 163 (1784).—Persoon, Syn. Pl. II. 418 (1807).—Willdenow, Spec. IV. 991 (1806).—De Candolle, Prodr. I. 595 (1824).—Sprengel, Syst. Veg. II. 224 (1825).

Fatsia ? Mitsude De Vries, Tuinbouw Fl. III. 287 (1856).

Hedera japonica Junghuhn in Tijdschr. Natuurl. Geschied. Phys. VII. 307 (1840) (Nov. Gen. Spec. Pl. Jav. 25) (1840).—Walpers, Rep. II. 431 (1843).

Textoria japonica Miquel in Ann. Mus. Bot. Lugd.-Bat. I. 12 (1863); Prol. Fl. Jap. 90 (1867).

Dendropanax japonicum Seemann in Jour. Bot. II. 301 (1864); Rev. Hedr. 27 (1868).—Franchet & Savatier, Enum. Pl. Jap. I. 191 (1875).—Biessner, Schelle & Zabel, Handb. Laubholz.-Ben. 362 (1903).

Aralia Mitsude Siebold apud Lavallée, Arb. Segrez. 125 (1877).

Gilibertia japonica Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 41 (1894).—Ito & Matsumura in Jour. Coll. Sci. Tokyo, XII. 271 (Tent. Fl. Lutch.) (1899).

Dendropanax trifidum Makino in Tokyo Bot. Mag. xv. 91 (1901), pro synon.

Hedera rhombea Siebold & Zuccarini in Abh. Akad. Muench. IV. pt. II. 202 (Fl. Jap. Fam. Nat. I. 94) (1845), pro parte, fide Tobler; nomen nud.

TSUSHIMA: in silvis montis Sumo-shiratake, *T. Nakai;* in monte Ariakeyama, *Y. Yabe*.

KYUSHU: in prov. Satsuma (*coll.?*); Obi, prov. Hiuga, *K. Saida*, *E. H. Wilson*, no. 6225; in insula Yakushima, *U. Faurie*, no. 3983, *E. H. Wilson*, no. 6018.

LIUKIU: in insula Okinawa, *M. Morita*.

SHIKOKU: Kofumura, prov. Awa, *J. Nikai*, no. 2491; Nanokawa, prov. Tosa, *K. Watanabe*.

HONDO: in insula Niijima, prov. Idzu, *S. Okubo;* Wakanoura, prov. Kii, *R. Yatabe;* Yada, prov. Suwo, *J. Nikai*, no. 397; Enoshima insulae Sagami, *E. H. Wilson*, no. 7781; ibidem, *H. Sakurai;* Otaki, prov. Kadzusa (*coll. ?*); Komono, prov. Ise, *I. Sono;* Yokohama, *J. Maximowicz.*

Gilibertia sinensis Nakai, sp. nov.

Dendropanax japonicum Forbes & Hemsley in Jour. Linn. Soc. XXIII. 342 (1888).—Dunn & Tutcher in Bull. Misc. Inform. Kew, add. ser. X. 119 (1912).—Non Seemann.

Rami annotini cinerei lenticellis punctati, hornotini virides glabri. Petioli 0.5–5.0 cm. longi, supra canaliculati, foliorum ramorum elongatorum usque ad 12 cm. longi. Folia ramorum elongatorum 3–5-fida usque ad 18 cm. longa et 21 cm. lata, lobis oblanceolatis acuminatis denticulatis. Umbellae glabrae, simplices vel basi ramosae; bracteae ovatae acuminatae; pedunculi 2–3 cm. longi; bracteolae involucrantes parvae triangulares; pedicelli basi rufo-barbati, circiter 1 cm. longi; flores 30–150 in quaque umbella, densi; calycis lobi 5, breves, mucronulati; petala 5, triangularia, 2 mm. longa, reflexa; stamina 5, erecta; filamenta 2.5–3.0 mm. longa; styli 5, connati, apice liberi, post anthesin stellatim divergentes.

CHINA: Kwangtung, *E. D. Merrill*, no. 1374, 1376, 1433, 1525; in monte Lofouschan, alt. 1000 m., *H. Handel-Mazzetti*, no. 132; Tien-Tai-Shan, prov. Che-kiang, *J. Hers*, no. 331; prope Chang-hua, prov. Che-kiang, *F. N. Meyer*, no. 1530; Fukien, near Foochow, *J. B. Norton*, no. 1363.

This new species which is closely allied to the Japanese *G. trifida* may be distinguished by its stellate stigma.

Gilibertia pellucido-punctata Hayata, Icon. Pl. Form. II. 62 (1912).—Kanehira, Formos. Trees 276, fig. (1918).

Dendropanax spec. Hayata in Jour. Coll. Sci. Tokyo, XXV. art. XIX. 110 (Fl. Mont. Formos.) (1908).

FORMOSA: in monte Arisan, *B. Hayata;* in monte Niitakayama, *T. Kawakami & U. Mori*, no. 2041; in monte Arisan, prov. Kagi, *E. H. Wilson*, no. 9773.

Styli apice liberi, post anthesin divergentes.
Ramus gracilis. Folia subtus pellucido-punctata. Inflorescentia 10–20-flora. *G. pellucido-punctata.*
Ramus robustus. Folia epunctata. Inflorescentia 30–150-flora.... *G. sinensis.*
Styli in columnam connati.
Lactifera. Fructus ellipsoideus..... *G. morbifera.*
Resinifera. Fructus sphaericus..... *G. trifida.*

Hedera L.

Hedera [Tournefort, Instit. Rei Herb. 612, 384 (1700).—Linnaeus, Gen. 160 (1737); Hort. Cliff. 74 (1737).—] Linnaeus, Gen. ed. 5, 94 (1754).—De Candolle, Prodr. IV. 261 (1830), pro parte, non Swartz.—G. Don, Gen. Syst. III. 391 (1834).—Endlicher, Gen. Pl. 795 (1836–40), pro parte.—Bentham & Hooker, Gen. Pl. I. 946 (1867), pro parte.—Harms in Engler & Prantl, Pflanzenfam. III. abt. 8, 41 (1894).

Species 7 in Europe et Asia incolae, inter eas tres in Imperio Japonicoi sponte nascent.

Pedunculi elongati 12 cm. longi. Pedicelli 2–4 cm. longi.....*H. pedunculata.*
Pedunculi quam 5 cm. breviores. Pedicelli circiter 1 cm. longi.
Petala circiter 2 mm. longa. Folia ramorum floriferorum lanceolata v. ovata *H. formosana.*
Petala circiter 3 mm. longa. Folia ramorum floriferorum ovata v. angulata, rarius lanceolata.....*H. japonica.*

Hedera pedunculata Nakai, sp. nov.

Hedera Helix Ito & Matsumura in Jour. Coll. Sci. Tokyo, XII. 539 (1899), pro parte?; non Linnaeus.

Rami juvenilespilis stellulato multiradiatis sparsim vestiti. Folia biennia; petioli 1–3 cm. longi, juveniles sparsissime stellulati sed mox glabrescentes; lamina foliorum ovato-lanceolata vel ovata, supra viridis lucida,infra pallida, venis elevatis, 3 cm. lata et 7 cm. longa (3 : 6.5, 2.4 : 6.c, 2.3 : 5.5, 1.4 : 3.0 etc.). Pedunculi 12 cm. longi, ramo solitario instructi, subglabri; bracteae ovatae, dense fusco-stellulatae; pedicelli 2–4 (rarissime 1) cm. longi, stellulato-pilosi; calycis tubus turbinatus, stellulatus, edentatus; petala triangularia vel ovata, 3 mm. longa, valvata, intus medio costato-elevata; stamina 5; filamenta 2 mm. longa; antherae ovatae, 1 mm. longae; connectivum evolutum; discus conicus, rarissime stellulatus, in stylum brevem abiens; stigma obscure 3-lobum. Bacca ignota.

LIUKIU: sine loco speciali, *S. Yajima.*

Hedera formosana Nakai, sp. nov.

Hedera Helix Hayata in Jour. Coll. Sci. Tokyo, XXIV. art. XIX. 110 (Fl. Mont. Formos.) (1909); Icon. Pl. Formos. II. 62 (1912).—Matsumura, Ind. Pl. Jap. II. 2,.419 (1912), pro parte.—Non Linnaeus.

Rami juveniles subglabri, rarissime stellulati. Petioli 1.0–5.5 cm. longi, glaberrimi; folia lanceolata vel late lanceolata vel subrhombea, basi cuneata vel late cuneata, apice attenuata plus minus obliqua, supra glabra lucida, infra pallida glabra. Umbellae subcorymbosae, stellulato-pilosae; bracteae minutissimae; pedicelli 6–8 mm. longi, stellato-pilosi; calycis tubus breviter turbinatus, dense stellulato-pilosus, 1 mm. longus; petala subreflexa, ovata, intus supra medium costato-elevata, 2.0–2.5 mm. longa, extus stellulata; filamenta 2 mm. longa; antherae ovatae; connectivum haud evolutum; discum brevissime conicum; styli 1 mm. longi; stigmata obscure 5-lobata. Bacca (fide Sasaki) nigra.

FORMOSA: in monte Morrison, 6000 ped., *T. Kawakami & U. Mori*, no. 2017; Tapposha, *T. Kawakami & U. Mori*, no. 1970; in monte Morrison, 2100 m. ped., *T. Kawakami & U. Mori*, no. 1887; in monte Arisan, prov. Kagi, *E. H. Wilson*, no. 9697, 10801; Sozan, *E. H. Wilson*, no. 11237.

Hedera japonica Tobler, Gatt. Hedera, 84, fig. 43–44a (1912).—Fedde, Rep. Spec. Nov. XIII. 160 (1914).—Rehder in Bailey, Stand. Cycl. Hort. III. 1438 (1914).—Non Junghuhn.

Hedera rhombea Siebold & Zuccarini in Abh. Akad. Muench. IV. pt. II. 202 (Fl. Jap. Fam. Nat. I. 94) (1845), pro parte, nomen nud.—Lavallée, Arb. Segrez. 126 (1877), nomen nud.—Bean, Trees & Shrubs Brit. Isles, I. 609 (1914).

Hedera Helix Thunberg, Fl. Jap. 102 (1784).—Siebold & Zuccarini, l. c.—Franchet & Savatier, Enum. Pl. Jap. I. 194 (1875).—Non Linnaeus.

Hedera Helix var. *rhombea* Miquel in Ann. Mus. Bot. Lugd.-Bat. I. 13 (1863), incl. f. angustifolia et latifolia.—Franchet & Savatier, Enum. Pl. Jap. I. 195 (1875).—Nicholson, Gard. Dict. II. 122 (1887).—Beissner, Schelle & Zabel, Handb. Laubholz.-Ben. II. 122 (1887).

Hedera colchica Seemann in Jour. Bot. II. 307 (1864), pro parte.—Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 42 (1894), pro parte.—Palibin in Act. Hort. Petrop. XVII. 99 (Consp. Fl. Kor. I.) (1898).—Nakai, Fl. Kor. I. 274 (1909).—Non K. Koch.

? *Hedera japonica* Paul in Gard. Chron. 1867, 1215; in Florist & Pomol. 1870, 272.

Hedera Helix v. *japonica* Lavallée, Arb. Segrez. 126 (1877), nom. nud.

Hedera japonica Siebold ex Lavallée, l. c. (1897), pro synon.

Hedera Helix var. *colchica* Makino in Tokyo Bot. Mag. VIII. 300 (1894); non K. Koch.

DAGELET: in rupibus Dodo, *T. Ishidoya*, no. 104; ibidem, *T. Nakai*, no. 4473, ibidem, *E. H. Wilson*, no. 8571; sine loco speciali, *K. Okamoto;* in arboribus Taika, *T. Nakai*, no. 4474.

KOREA: in rupibus Chojyo, *T. Nakai*, no. 1010; in rupibus montis Paiyangsan, *T. Nakai*, no. 1036; in rupibus insulae Setto, *T. Nakai*, no. 9645; in arboribus montium Roseidai, *T. Nakai*, no. 9644; in arboribus Dojiri, *T. Nakai*, no. 9747; in arboribus insulae Pogilto, *T. Nakai*, no. 9746; in arboribus insulae Okto, *T. Nakai*, no. 471; in insula Zetsueito, *T. Uchiyama;* in insula Soanto, *Y. Hanabusa;* Mokpo, *T. Uchiyama*.

QUELPAERT: in rupibus Tschejyu, *T. Nakai*, no. 6357; in sepibus Hongno, *T. Nakai;* Saishu, *E. H. Wilson*, no. 9318; in rupibus Yontanri, *T. Nakai*, no. 201; sine loco speciali, *T. Mori*, no. 80; in rupibus, *T. Ishidoya*, no. 256; in muris, *E. Taquet*, no. 139; in muris Hongno, *E. Taquet*, no. 888, 2918.

LIUKIU: Kekeah Isl., *C. Wright*, no. 102.

KYUSHU: Tarumimura, prov. Osumi, *Y. Nakano;* in monte Kirishima, *R. Yatabe;* ibidem, *Z. Tashiro;* in monte Higashikirishima, *E. H. Wilson*, no. 6188; in insula Tanegashima, *E. H. Wilson*, no. 6150; Nagasaki, *J. Maximowicz;* ibidem, *R. Oldham*, no. 316.

SHIKOKU: Kamomyomura, prov. Awa, *J. Nikai*, no. 2492; Nanokawa, prov. Tosa, *K. Watanabe*.

HONDO: Tanabe, prov. Kii, *I. Sono;* Okunimoto, prov. Uzen, *K. Nemoto;* Kuroiwa, prov. Iwashiro, *K. Nemoto;* Tokyo, *J. Matsumura;* in prov. Kii, *Hibino;* Hikami, prov. Suwo, *J. Nikai*, no. 396; Wakanoura, prov. Kii. (coll. ?); in insula Oshima, prov. Idzu, *G. Koidzumi;* ibidem, *E. H. Wilson*, no. 8190; Numadzu, prov. Suruga (coll. ?); Shiogama, prov. Rikuzen, *U. Faurie*, no. 6842; ibidem, *J. G. Jack;* Hakone, prov. Sagami, *C. S. Sargent;* Naba, prov. Harima, *K. Omura;* in monte Amagi, prov. Idzu, *S. Okubo;* ibidem, *H. Matsudaira;* Simoda, prov. Idzu, *C. Wright*.

Hedera japonica f. **variegata** Nakai.

Hedera rhombea variegata Paul in Gard. Chron. 1867, 1215; in Florist & Pomol. 1870, 272.

Hedera Helix submarginata Hibbert, Ivy, 80, fig. (p. 89) (1872).

Hedera Helix var. *japonica foliis variegatis* Lavallée, Arb. Segrez. 126 (1877).

Hedera Helix var. *rhombea variegata* Rehder in Bailey, Cyclop. Am. Hort. II. 716 (1901).
Hedera Helix rhombea marginata hort. apud Beissner, Schelle & Zabel, Handb. Laubholz.-Ben. 364 (1903).
Folia albo-marginata. In hortis Japonicis sat vulgaris.

Hedera japonica f. **argentea** Nakai.
Hedera Helix rhombea argentea hort. apud Beissner, Schelle & Zabel, Handb. Laubholz.-Ben. 364 (1903).
Folia variegata saepe fere alba.
Hedera Helix rhombea ovata Beissner, Schelle & Zabel l. c. is hardly distinguishable.

Pentapanax Seem.

Pentapanax Seemann in Jour. Bot. II. 294 (1864), pro parte.—Bentham & Hooker, Gen. Pl. I. 936 (1867), pro parte.—C. B. Clarke in Hooker, Fl. Brit. Ind. II. 724 (1879), pro parte.—Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 55 (1897), pro parte.

As H. Harms has already pointed out (in Bot. Jahrb. XXIII. 20–21 (1896)) *Pentapanax racemosum* and *P. subcordatum* are better separated from the other species of Pentapanax; they are terrestrial plants with the inflorescence arranged in racemes.

Pentapanax castanopsidicola Hayata, Icon. Pl. Form. v. 74, f. 15, t. 7 (1915), "castanopsisicola."

FORMOSA: Funkiko, *B. Hayata;* in monte Arisan, prov. Kagi, *E. H. Wilson*, no. 10899.

Dr. Hayata seems to have based his description of the flowers on the figures drawn by F. Hayami who mistook the black fungus on the half rotten specimen for hairs. He also overlooked the existence of *Pentapanax verticillatum*, *P. yunnanense* and *P. Henryi* in China and wrote of the genus as new to the East Asiatic flora.

Aralia L.

Aralia [Tournefort, Instit. Rei Herb. 300, t. 154 (1700).—Linnaeus, Gen. Pl. 88, n. 251 (1737); Hort. Cliffort. 113 (1737)].—Linnaeus, Gen. Pl. ed. 5, 134 (1754).—Houttuyn, Pflanzensyst. I. 408 (1777).—Jussieu, Gen. Pl. 218 (1789).—Ventenat, Tabl. III. 3 (1799).—Persoon, Syn. Pl. I. 331 (1805), pro parte.—De Candolle, Prodr. IV. 257 (1830), pro parte.—G. Don, Gen. Syst. III. 388 (1834), pro parte.—Endlicher, Gen. Pl. 794 (1836–40).—C. B. Clarke in Hooker f., Fl. Brit. Ind. II. 721 (1879), excl. sect. Ginseng.—Bentham & Hooker, Gen. Pl. I. 936 (1867), excl. sect. Ginseng.—Seemann in Jour. Bot. VI. 133 (1868).—Miquel in Ann. Mus. Bot. Lugd.-Bat. I. 6 (1863).—Sargent, Silva N. Am. v. 57 (1893).—K. Koch, Dendr. I. 672 (1869).—Britton & Brown, Ill. Fl. II. 505 (1897).—Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 56 (1897), excl. Ab; in Bot. Jahrb. XXIII. 11 (1896).

Dimorphanthus Miquel, Comm. Phyt. 95, t. 12 (1838).—Endlicher, Gen. Pl. Suppl. II. 70 (1842).

Aralia sect. *Dimorpanthus* Miquel in Fl. Ind. Bat. I. 749 (1885); in Ann. Mus. Bot. Lugd.-Bat. I. 6 (1861).

Flores polygamo-monoeici.

Herbae perennes. Folia ternato-pinnata.
Glabra. Pedicelli 1–2 cm. longi.....*A. glabra.*
Plus minus praecipue in inflorescentia pilosa. Pedicelli 1.0–1.5 cm. longi.
Calycis tubus glaber.....*A. cordata.*
Calycis tubus rufescenti-pilosus.....*A. cordata* var. *sachalinensis.*
Frutices vel arbusculae.
Foliola ovato-lanceolata, subtus glauca, glaberrima. Inflorescentia rufescenti-pilosa.....*A. hypoleuca.*
Foliola ovata vel late ovata vel ovato-oblonga.
Rachis foliorum fuscescente-barbata; foliola ovato-oblonga, grosse dentata, subtus glaucina et fuscescenti-pubescentia.....*A. Decaisneana.*
Rachis foliorum glabra sed saepe aculeata.
Folia subtus glaucescentia secus venas glabra vel pilosa.....*A. elata.*
Folia subtus fuscescenti- vel albescenti-pubescentia
A. elata var. *canescens.*

Aralia glabra Matsumura in Tokyo Bot. Mag. XI. 441 (1897), nom. nud.; XII. 17 (1899); Ind. Pl. Jap. II. pt. 2, 418 (1912).—Komatsu in Matsumura, Icon. Pl. Koishik. I. 143 Pl. 72 (1913).

HONDO: Yumoto, prov. Shimotsuke, *J. Matsumura, H. Sakurai, S. Komatsu;* Komagatake, prov. Shinano, *H. Sakurai.*

Aralia cordata Thunberg, Fl. Jap. 127 (1784).—Willdenow, Sp. Pl. I. 1519 (1797).—Persoon, Syn. Pl. I. 331 (1805).—Sprengel, Syst. I. 952 (1825).—De Candolle, Prodr. IV. 258 (1830).—G. Don, Gen Syst. III. 389 (1834).—Miquel in Ann. Mus. Bot. Lugd.-Bat. I. 9 (1863).—Franchet & Savatier, Enum. Pl. Jap. I. 191 (1875).—Marchal in Bull. Soc. Bot. Belg. XX. 86 (1881).—Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 57 (1894); in Bot. Jahrb. XXIII. 15 (1896).—Komarov in Act. Hort. Petrop. XXV. 125 (Fl. Mansh. III.) (1907).—Matsumura, Ind. Pl. Jap. II. pt. 22, 418 (1912).—Rehder in Bailey, Stand. Cyclop. Hort. I. 344 (1914).

Aralia edulis Siebold in Verh. Batav. Genootsch. XII. no. 1. 45 (Syn. Pl. Oecon. Jap.) (1830).

Aralia edulis Siebold & Zuccarini, Fl. Jap. I. 57, t. 25 (1837); in Abh. Akad. Muench. IV. pt. II. 201 (Fl. Jap. Fam. Nat. I. 93) (1845).—Seemann in Jour. Bot. VI. 134 (1868).

Aralia nudicaulis Blume, Bijdr. 870 (1826); non Linnaeus.

Aralia nutans Franchet & Savatier, Enum. Pl. Jap. II. 376 (1879).

Aralia racemosa var. *sachalinensis* Makino in Tokyo Bot. Mag. VIII. 224 (1894); non Regel.

Dimorphanthus edulis Miquel, Comm. Phyt. 96 (1837).—Walpers, Repert. II. 431 (1843).

DAGELET: in silvis Dodo, *T. Nakai*, no. 4638; in silvis Joho, *T. Nakai*, no. 4752; in Dodo, *T. Ishidoya*, no. 105; sine loco speciali, *K. Okamoto.*

SAGHALIN: Dui, *Glehn.*

MANSHURIA: circa Schisidagon, prov. Mukdensis, *V. Komarov*, no. 1152.

KOREA: in monte Kantairei, *T. Mori;* Chodado, *T. Nakai*, no. 3685; Taikori, *T. Nakai*, no. 3463; in monte Chirisan, *T. Nakai*, no. 759; in montibus Gensan, *U. Faurie*, no. 209.

CHINA: Pan lan shan, prov. Szechuan, *E. H. Wilson*, no. 4285.

QUELPAERT: in silvis Hallaisan, alt. 1200 m., *E. Taquet*, nos. 5663, 5664; in sepibus Yengsil, *E. Taquet*, no. 4465; in herbidis Hallaisan, *E. Taquet*, no. 138.

KYUSHU: Yoshino, prov. Satsuma, *Z. Tashiro;* Nagasaki, prov. Hizen, *R. Oldham*, no. 310.

SHIKOKU: in monte Ishidzuchisan, prov. Iyo, *G. Koidzumi;* Nanokawa, prov. Tosa, *K. Watanabe.*

HONDO: pede montis Iidesan, *J. Matsumura;* in monte Ontakesan, *G. Koidzumi;* Nikko, *K. Sawada;* Kohara, prov. Echizen, *J. Matsumura;* Hikami, prov. Suwo, *J. Nakai*, no. 399; Aomori, prov. Mutsu, *R. Yatabe;* Nasuno, prov. Shimotsuke, *H. Sakurai;* in monte Iwatesan, prov. Mutsu, *H. Sakurai;* Yokohama, prov. Musashi, *C. J. Maximowicz.*

YESO: Sapporo, *R. Yatabe;* ibidem, *S. Arimoto;* Muroran, prov. Iburi, *J. Matsumura;* sine loco speciali, *L. Boehmer;* Hakodate, prov. Oshima, *Albrecht.*

Aralia cordata var. **sachalinensis** Nakai, comb. nov.

Aralia racemosa var. *sachalinensis* Regel in Gartenfl. XIII. 100, t. 432 (1864).

Vulgo elatus. Calycis tubus pilosus.

YESO: in declivitate Zenibako, *T. Nakai.*

SAGHALIN: Sine loco speciali, *Migul.*

The variety *sachalinensis* differs from the type in its pubescent calyx. Regel says "Blüthenstiele und Fruchtknoten dicht kurzhaarig." His Fruchtknoten does not mean ovary but the calyx-tube. In the type the calyx-tube is perfectly smooth. Fr. Schmidt (in Mém. Acad. Sci. St. Pétersb. ser. 7, XII. no. II. 141 [1868]) says "Calycibus majoribus oblongis quam petala longioribus." If this character is true for his specimen, it must be a variety distinct from the true *sachalinensis*; in Regel's figure the lobes of calyx are small and never exceed the petals. Makino's var. *sachalinensis* is the typical Udo, *Aralia cordata*, as the specimens bearing this name in his handwriting prove.

Aralia hypoleuca Presl, Epim. Bot. 250 (1849).—Hayata in Jour. Coll. Sci. Tokyo, XXX. art. I. 131 (1909); Icon. Pl. Formos. II. 58 (1912).—Kanehira, Formos. Trees, 273 (1917).

Aralia spinosa Forbes & Hemsley in Jour. Linn. Soc. XXIII. 338 (1888), quoad pl. e Formosa; non Linnaeus.

PHILIPPINES: monte Umingan insulae Luzon, *Ramos & Edano*, no. 26495; Isl. Negros, *Elmer*, no. 10427.

FORMOSA: in monte Arisan, *E. H. Wilson*, nos. 9654, 10798; Bankinsing, *A. Henry*, no. 15; Bongari, *G. Nakahara;* Shinten, *Nagasawa*, no. 456.

LIUKIU: insula Okinawa, *M. Kawaharada.*

According to S. Sasaki, this shrub grows in dry barren land of the temperate mountain region at about 1000–2100 m. above sea-level in Formosa. It is usually found growing in a higher zone than *Aralia Decaisneana*, rarely coming down to 300–600 m. or even to the plain in the Koshun peninsula.

Aralia elata Seemann in Jour. Bot. VI. 134 (1868); Rev. Heder. 90 (1868).—Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 57 (1894).

Dimorphanthus elatus Miquel, Comm. Phytogr. 95, t. 12 (1840).

Aralia canescens Siebold & Zuccarini in Abh. Akad. Muench. IV. pt. II. 202 (Fl. Jap. Fam. Nat. I. 94) (1845).—Lavallée, Arb. Segrez. 125 (1877).

Dimorphanthus mandshuricus Ruprecht & Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 133 (Prim. Fl. Amur.) (1859).—Fr. Schmidt in Mém. Acad. Sci. St. Pétersb. ser. 7, XII. no. II. 141 (Fl. Sachal.) (1868).

Aralia Mandshurica Seemann in Jour. Bot. VI. 134 (1868).

Aralia mandshurica Maximowicz in Bull. Phys.-Mat. Acad. Sci. St. Pétersb. XV. 134 (1856); in Mél. Biol. II. 427 (1857).

Aralia manshurica Komarov in Act. Hort. Petrop. XXV. 123 (Fl. Mansh. III.) (1907).

Aralia spinosa Miquel in Ann. Mus. Bot. Lugd.-Bat. I. p. 7 (1863), pro parte, non Linnaeus.

Aralia spinosa v. *canescens* Sargent, Silva North Am. V. 60 (1893).

Aralia chinensis v. *canescens* Koehne, Deutsch. Dendr. 432 (1893).—Dippel Handb. Laubholzk. III. 233 (1893), excl. pl. Chin.—Rehder in Bailey, Cycl. Am. Hort. I. 88 (1900).

Aralia spinosa v. *glabrescens* Franchet & Savatier, Enum. Pl. Jap. I. 191 (1875).

Aralia chinensis v. *glabrescens* Schneider, Ill. Handb. Laubholzk. II. 431 (1911), excl. Pl. Chin.—Rehder in Bailey, Stand. Cycl. Hort. I. 344 (1914).

MANSHURIA: prov. Kirinensis, *V. Komarov*, no. 1151.

AMUR: *S. Korschinsky; C. J. Maximowicz.*

USSURI: circa Vladivostok, *C. S. Sargent;* ibidem, *Topping.*

KOREA: in insula Baikato, *T. Ishidoya & Chung*, no. 3631; in silvis Taikoji, *T. Nakai*, no. 9642; in monte Keiryusan, *T. Nakai*, no. 8107; in monte Hiraiho, *T. Nakai;* in monte Kyojitsurei, prov. Heinan, *T. Mori;* in monte Kongosan, *T. Nakai*, no. 5694; ibidem, *E. H. Wilson*, no. 10691; in monte Namsan, *T. Uchiyama;* Hansan Monastery, *Mills*, no. 418; in monte Chorei, *T. Uchiyama;* in insula Okto, *T. Nakai;* Shinkabachin, *E. H. Wilson*, no. 9096.

DAGELET: sine loco speciali, *K. Okamoto;* in monte Tongimi, *T. Nakai;* ibidem, *E. H. Wilson*, no. 8543.

QUELPAERT: Hallaisan, *T. Nakai*, no. 6361; Hongno, *T. Nakai;* sine loco speciali, *T. Mori.*

TSUSHIMA: Takeshiki, *Y. Yabe;* in monte Sumo-shiratake, *T. Nakai.*

SAGHALIN: *Fr. Schmidt.*

YESO: in monte Tokachidake, *G. Koidzumi.*

HONDO: in insula Oshima, prov. Idzu, *S. Okubo;* Otsu, prov. Omi, *I. Sono;* Hikami, prov. Suwo, *J. Nikai*, no. 398; Yokohama, *K. Hisauchi;* Okunimoto, prov. Uzen, *K. Nemoto.*

LIUKIU: in insula Okinawa, *T. Miyagi.*

Aralia elata f. variegata Nakai, comb. nov.

Aralia chinensis var. *variegata* Rehder in Bailey, Stand. Cycl. Hort. I. 344 (1914).

Aralia chinensis var. *albo-marginata* Bean, Trees & Shrubs Brit. Isles, I. 197 (1914).

Folia albo-marginata.

In hortis invenitur.

Aralia elata f. aureo-variegata Nakai, comb. nov.

Aralia chinensis var. *aureo-variegata* Rehder, l. c. Bean, l. c.

Folia aureo-variegata.

In hortis invenitur.

Aralia elata var. **canescens** Nakai, comb. nov.

Aralia spinosa var. *canescens* Franchet & Savatier, Enum. Pl. Jap. I. 192 (1875).

Aralia chinensis var. *elata* Dippel, Handb. Laubholzk. III. 233 (1893).—Rehder in Bailey, Cyclop. Am. Hort. I 82 (1900).

Aralia canescens Jäger & Beissner, Ziergeh. ed. 3, 37 (1889); non Siebold & Zuccarini.

Folia subtus albo- v. fuscescenti-velutina.

HONDO: Tokyo, *J. Matsumura;* Sendai, prov. Rikuzen, *K. Nemoto;* Yumoto, prov. Shimotsuke, *C. S. Sargent;* Chuzenji, prov. Shimotsuke, *J. G. Jack.*

YESO: sine loco speciali, *L. Boehmer;* circa Sapporo, *C. S. Sargent;* ibidem, *J. G. Jack;* Hakodate, prov. Oshima, *Albrecht.*

This species is distinguished from both *Aralia spinosa* and *A. chinensis* by the form of the inflorescence. In these two species the main axis of the inflorescence is elongated terminating the branch of the current year. Thus the inflorescence forms a terminal erect panicle. In *A. elata* the axis of the inflorescence is short and its main branches are well developed and more or less umbellate. The main branches of the inflorescence become themselves panicled spreading when in flower and drooping in fruit. *Aralia spinosa* has distinctly stalked leaflets by which it is distinguished from either *A. elata* or *A. chinensis*. *A. chinensis* has ordinarily finer serrations and more tapering leaflets than *A. elata*. We have an imperfect glabrescent specimen from Formosa. It lacks the inflorescence and I cannot ascertain to what species it really belongs. According to S. Sasaki this type grows in the whole island of Formosa below 1000 m. above sea-level and does not branch. A specimen from Western China (Wilson's no. 3692) has the leaflets minutely but sparsely ciliated all over the lower surfaces, but the pubescence is not velutinous as in the type.

Aralia chinensis Linnaeus, Spec. 273 (1753).—Houttuyn, Pflanzensyst. I. 41 (1777).—Lamarck, Encycl. Méth. I. 223 (1787).—Willdenow, Spec. I. 1520 (1797).—Persoon, Syn. Pl. I. 332 (1805).—De Candolle, Prodr. IV. 259 (1830).—G. Don, Gen. Syst. III. 389 (1834).—Seemann in Jour. Bot. VI. 133 (1868); Rev. Heder. 90 (1869).—K. Koch, Dendr. I. 673 (1869).—Jäger & Beissner, Ziergeh. ed. 3, 37 (1889), excl. syn.—Harms & Rehder in Sargent, Pl. Wilson. II. 566 (1916).

Aralia chinensis var. *canescens* Dippel, Handb. Laubholzk. III. 233 (1893), pro parte.—Schneider, Ill. Handb. Laubholzk. II. 431 (1911), quoad pl. e China.—Non Koehne.

Aralia spinosa Forbes & Hemsley in Jour. Linn. Soc. XXIII. 338 (1888), pro parte; non Linnaeus.

CHINA: Hupeh, *A. Henry*, no. 2104; ibidem, *E. H. Wilson*, no. 602; Hsingshan Hsien, *E. H. Wilson*, no. 622; prope Washan, *E. H. Wilson*, no. 1962; Ichang, *E. H. Wilson*, no. 1963; Fupe, Silvestri; Yunnan, *G. Forrest*, nos. 11505, 1256); in silva infra vicum Tungdjiapai, prope minas Hsikwangschan, prov. Hunan, *H. Handel-Mazzetti*, nos. 2447, 678, 811; Huangtsauba-Taipinggai, prov. Kweitschan, *H. Handel-Mazzetti*, no. 2020; prope Lantai Ting, prov. Kweichan, *O. Schoch*, no. 408; Ningpo Mts., *E. Faber*, no. 44.

Aralia chinensis var. **nuda** Nakai, nom. nov.

Aralia chinensis var. *glabrescens* Harms & Rehder in Sargent, Pl. Wilson. II. 567 (1911); non Schneider.

Aralia chinensis a. *elata* Dippel, Handb. Laubholzk. III. 233 (1893), quoad plantam e China.

Folia glaberrima vel infra secus costas sparcissime pilosella vel rarissime tota sparsim ciliolata. Inflorescentia tota vel apice tantum pilosa.

CHINA: Tsing si Hsien, prov. Kansu, *J. Hers*, no. 2428; Patung Hsi, prov. Hupeh, *E. H. Wilson*, no. 128; Kuling, prope Kiangsi, *E. H. Wilson*, no. 1508; Ichang, prov. Hupeh, *E. H. Wilson*, no. 128; Changyang-Hsien, *E. H. Wilson*, no. 128; Sui-an Hsien, prov. Chekiang, *J. Hers*, no. 235; Lao-yi San, prov. Shensi, *G. Giraldi*; Lushih, Tang Ho, alt. 100 m., prov. Honan, *J. Hers*, no. 948; Shih Tse Miao, alt. 1200 m., prov. Honan, *J. Hers*, no. 1271; Hai-chow Hills, prov. Kiangsu, *J. Hers*, no. 2274.

In the Arnold Arboretum there is a small plant raised from the seeds sent by J. Hers in 1919. The seeds were collected from the same tree as his specimen No. 1151.

Aralia Planchoniana Hance (in Jour. Bot. IV. 172, [1866]) is a very rusty-tomentose species and is entirely different from this. The specimen collected by C. O. Levine near Canton (no. 1853) belongs to this species.

Aralia Decaisneana Hance in Jour. Bot. IV. 172 (1866); in Ann. Sci. Nat. sér. 5, V. 215 (1866).

Aralia spinosa Forbes & Hemsley in Jour. Linn. Soc. XXIII. 338 (1888), pro parte.—Matsumura & Hayata, Enum. Pl. Form. 176 (1906), pro parte.—Hayata, Icon. Pl. Formos. II. 58 (1912).

Differt ab *A. chinensi* et *A. elata* rachi foliorum rufescenti-barbata, foliolis longioribus grosse dentatis.

FORMOSA: Hikaku, *T. Makino*.

According to S. Sasaki this species is limited to the middle part of Formosa where it grows in the low land below 1000 m. above sea-level.

Panax L.

Panax (Gronovius)[1] Linnaeus, Gen. Pl. [ed. 2, 105, no. 246 (1742);] ed. 5, 481 (1754), pro parte.—Trew, Pflanzensyst. X. 333 (1783), pro parte.—Jussieu, Gen. Pl. 218 (1789), pro parte.—Willdenow, Spec. IV. 1124 (1805), pro parte.—Endlicher, Gen. Pl. 793 (1836-40), pro parte.—Seemann in Jour. Bot. VI. 54 (1868).—Harms in Engler & Prantl, Nat. Pflanzenfam. III. abt. 8, 58 (1897); in Bot. Jahrb. XXIII. 1-3 (1896).

Araliastrum Vaillant, Sermo str. Fl. 40 (1718).—Trew, Pl. Select. t. 6. (1750).

Panax Trew apud Ventenat, Tab. Regn. Veget. III. 3 (1799).

Panax § 1. De Candolle, Prodr. IV. 252 (1830).—G. Don, Gen. Syst. III. 384 (1834).

Panax § 1. *Araliastrum* Vaillant apud Miquel in Ann. Mus. Bot. Lugd.-Bat. I. 14 (1863).

[1] Gronovius, Fl. Virgin. II. 147 (1739).

Panax § 1. *Eupanax* Torrey & Gray, Fl. North Am. I. 607 (1838–40).
Aralia sect. 1. *Ginseng* Bentham & Hooker, Gen. Pl. I. 936 (1867).—C. B. Clarke in Hooker, Fl. Brit. Ind. II. 721 (1879.)
Panax subgenus *Aureliana* C. A. Meyer in Bull. Phys.-Math. Acad. Sci. St Pétersb. I. 340 (1843).

Linné's Panax comprises *Panax trifoliatum*, *P. quinquefolium* and *P. fruticosum*. The last, however, is a species of Nothopanax with double pinnate leaves and valvate petals. Many authors like Houttuyn, Jussieu, Willdenow, Aiton, Endlicher and others have followed him. But from the time of A. P. de Candolle many species of the Nothopanax-type have been added to the genus and its characters gradually have come to represent the conception of Decaisne & Planchon or Bentham & Hooker. Seemann who made a thorough study of the Araliaceae known at his time reverted to the Linnean conception of the genus and improved it by excluding from it *Panax fruticosum*. Harms has followed him and this is really the best disposition.

Panax japonicum C. A. Meyer in Bull. Phys.-Math. Acad. Sci. St. Pétersb. I. 340 (1840), excl. syn. *P. quinquefolium* var. *japonicum*.— Walpers, Repert. v. 924 (1846).

Panax Schin-seng var. *japonica* Nees, Icon. Pl. Medic. Suppl. fasc. 5, comp. 69, t. color. 16, B. B1 (1833).
Panax quinquefolium δ. *subsessilis* Miquel in Ann. Mus. Bot. Lugd.-Bat. I. 14 (1863).
Panax repens Maximowicz in Bull. Acad. Sci. St. Pétersb. XII. 64 (1867); in Mél. Biol. VI. 264 (1868).—Franchet & Savatier, Enum. Pl. Jap. I. 192 (1875).—Matsumura, Ind. Pl. Jap. II. 2, 421 (1912).
Panax Ginseng var. *repens* Makino in Iinuma, Somokudzusetsu, rev. ed. I. 321 (1907).
Panax Ginseng var. *japonicum* Makino in Tokyo Bot. Mag. XXIV. 223 (1910).
Aralia repens Makino in Tokyo Bot. Mag. VIII. 225 (1894).
Aralia quinquefolia var. *repens* Burkill in Kew Bull. Misc. Inform. 1902, 6.

Panax japonicum f. **typicum** Nakai.

Foliola 5–7, duplicato-serrulata, obovata vel oblanceolata. Bacca coccinea.

Hondo: Nikko, *S. Okubo;* ibidem, *K. Sawada;* in monte Kiyozumi, prov. Awa, *S. Okubo;* in monte Chokaizan, *R. Yatabe;* Hondojisan, *R. Yatabe;* prov. Kawachi, *T. Tada;* in monte Jyujyotoge, prov. Idzu, *J. Matsumura;* Aidzu, *R. Yatabe;* in monte Takao, *S. Okubo;* in monte Ontake, *J. Matsumura;* in monte Mitake, prov. Musashi, *Y. Yabe;* in monte Komagatake, prov. Echigo, *B. Hayata;* in monte Iidesan, *R. Yatabe;* Hakone, *J. Matsumura;* in monte Kongosan, prov. Kawachi, *S. Matsuda;* in monte Hakusan, prov. Kaga, *R. Yatabe* et *J. Matsumura;* ibidem, *H. Sakurai;* in monte Hakkodasan, prov. Mutsu, *H. Koidzumi;* in monte Tateyama, prov. Etchu, *J. Matsumura;* Tenisan, prov. Iwashiro, *G. Nakahara;* Yoshino, prov. Yamato, *H. Sakurai;* in monte Komagatake, prov. Shinano, *H. Sakurai;* in monte Hiei, prov. Omi, *I. Sono;* Shikayu, prov. Mutsu, *H. Sakurai;* Chichibu, prov. Musashi, *H. Sakurai;* Kamasaki, prov. Rikuzen (coll. ?); Takaoyama, prov. Musashi, *K. Watanabe.*

YESO: sine loco speciali, *L. Boehmer;* Nopporo, prov. Ishikari, *T. Nakai;* in monte Moiwa circa Sapporo, *J. Matsumura;* Sapporo, *K. Miyabe;* ibidem, *E. Tokubuchi;* ibidem, *S. Arimoto;* Murolan, prov. Iburi, *K. Saida* Cape Sangar, *J. Small;* Hakodate, *C. J. Maximowicz.*

KYUSHU: in monte Kirishimayama, prov. Osumi, *R. Yatabe;* Fukabayama, prov. Higo, *Z. Tashiro.*

TSUSHIMA: in monte Mitake, *Otani;* in monte Tendoyama, *T. Nakai;* sine loco speciali, *C. Wilford.*

Panax japonicum f. **trifoliolatum** Nakai, comb. nov.

Panax Ginseng var. *repens* f. *trifoliolatum* Makino in Iinuma's Somokudzusetsu rev. ed. 322 (1907).

Panax Ginseng var. *japonica* f. *trifoliolatum* Makino in Tokyo Bot. Mag. XXIV. 224 (1910).

Folia digitatim 3- (rarius 4)-foliolata. Fructus ut in typo.

HONDO: Nikko, prov. Shimotsuke, *K. Sawada.*

SHIKOKU: in monte Kodzusan, prov. Awa, *J. Nikai,* no. 1467.

Panax japonicum f. **lancifolium** Nakai, forma nova.

Foliola anguste oblanceolata subsimpliciter serrulata.

HONDO: monte Zissokutoge, prov. Idzu, *J. Matsumura;* in monte Kiyozumi, prov. Awa, *S. Okubo.*

KYUSHU: Obi, prov. Hiuga, *K. Saida.*

Panax japonicum f. **incisum** Nakai, forma nova.

Foliola inciso-duplicato-serrata.

HONDO: in monte Kongosan, prov. Kawachi, *S. Matsunda.*

SHIKOKU: in monte Tsurugisan, prov. Awa, *J. Nikai,* no. 1316; Yasui mura, prov. Tosa, *S. Yano.*

Panax japonicum f. **dichrocarpum** Nakai, comb. nov.

Panax quinquefolia b. *japonica* cc. fructibus apice nigris Siebold in Verh. Batav. Genoot. XII. no. 1, 45 (Syn. Pl. Oecon. Jap.)(1830).

Panax Ginseng var. *japonicum* f. *dichrocarpum* Makino in Tokyo Bot. Mag. XXIV. 224, excl. syn. (1910).

Folia ut typica. Bacca coccinea apice nigra.

HONDO: in silvis montis Takaosan, prov. Musashi, *T. Nakai.*

Panax japonicum f. **xanthocarpum** Nakai, comb. nov.

Panax quinquefolia b. *japonica* cc. fructibus flavis, Siebold in Verh. Batav. Genoot. XII. 45 (Syn. Pl. Oecon. Jap.) (1830).

Panax Ginseng var. *japonicum* f. *xanthocarpum* Makino in Tokyo Bot. Mag. XXIV. 224 (1910).

Folia ut typica. Fructus flavus.

In montibus Japonicis crescere dicitur sed mihi adhuc ignotum.

Maximowicz used a new name *Panax repens* for this species citing the following reason.

"Nomen *P. japonicum* C. A. Mey., *P. quinquefolia* var. *japonicae* Siebold superstructi, delendum, quia specimen Sieboldii unicum, a botanico Japonensi Keiske datum, verosimiliter nil nisi exemplar monstrosum *P. Ginseng*, qualia aegre a Japonensibus conservantur, radix vero, certe seorsim a Sieboldio reportata, quia omnino non mos est Japonensium, radices una cum reliqua planta exsiccare,

praesertim si molis tam est incommodae, et praeterea, quia a Miquelio, qui spec. auth. examinata, sub silentio praeteriter, nostro *P. repenti* desumta est." (See Mél. Biol. VI. 266–267 [1867]).

C. A. Meyer remarks:

"Erst v. Siebold, dem wir so viel für die Kenntniss Japan's zu verdanken haben, machte auf die Verschiedenheit dieser Pflanzen, sowie des japanischen Ginschen, aufmerksam, und Fr. Nees von Esenbeck sah sich veranlasst, zwei Arten anzunehmen, den amerikanischen *Panax quinquefolius* und den asiatischen *P. Schinseng;* diese letztere Art umfasst, nach des Verfassers Ansicht, den mandshurisch-chinesischen und den japanishen Ginschen, so wie den nepalischen *P. Pseudo-ginseng.*" (See Bull. Phys.-Math. Acad. Sci. St. Pétersb. I. 339 [1824]).

Though Meyer's name *Panax japonicum* might possibly have been derived from Siebold's *Panax quinquefolium* b. *japonicum*, his description is based entirely on the figure of Nees, since he says "Plantam non vidi, sed ex icone speciem omnino distinctam esse credo," and Siebold did not have a figure, while Nees von Esenbeck published an excellent colored plate in his Icones Plantarum Medicinalium. According to Meyer's description "rhizomate repente, fibris lateralibus fusiformibus; squama decidua ad basin caulis; foliolis 5 oblongis acuminatis profunde serratis" the plant cannot be any other than this species. Eliminating the synonym *P. quinquefolium* b. *japonicum* Siebold, the name *P. japonicum* becomes the correct name for this species and *Panax repens* becomes its synonym. So far as I know there is no yellow-fruited *Panax Ginseng*. I think Siebold made his note from memory and mistook *Panax japonicum* and his specimen of *Panax schin-seng* for the same species.

Panax schin-seng Nees, Icon. Pl. Med. suppl. fasc. 5, t. 16 A–A3, d, e, f excl. var. 2 and 3 (1833).

Panax quinquefolia a. *coreensis* Siebold in Verh. Batav. Genoots. XII. 45 (Syn. Pl. Oecon. Jap.) (1830); nom. nud.

P. quinquefolia b. *japonica* Siebold l. c., fide Maximowicz.

Panax Ginseng C. A. Meyer in Bull. Acad. St. Pétersb. sér. 2, I. 340 (1843).—Walpers, Rep. V. 924 (1846).—Franchet & Savatier, Enum. Pl. Jap. I. 192 in nota sub *P. repens* (1875).—Seemann in Jour. Bot. II. 320 (1864); IV. 54 (1868).—Harms in Engler & Prantl, Nat. Pflanzanfam. III. abt. 8, 59, fig. 10 & 11 (1867); in Bot. Jahrb. XXIII. 10 (1897).—Palibin in Act. Hort. Petrop. XVII. 100 (Consp. Fl. Kor. I.) (1898).—Komarov in Act. Hort. Petrop. XXV. 126 (Fl. Mansh. III.) (1907).—Makino in Iinuma, Somokudzusetsu, rev. ed. 319 (1907).—Nakai, Fl. Kor. I. 279 (1909).

Panax quinquefolium var. *Ginseng* Regel & Maack apud Regel in Gartenfl. XI. 314, t. 375, fig. a-d, f, i, k (1862).

Aralia quinquefolia var. *Ginseng*, Guide to Kew Museum, no. I. 87 (1886), fide Burkill in Kew Bull. Misc. Inf. 1902, 6.

Panax schin-seng var. **coraiense** Nees, Icon. Pl. Med. suppl. fasc. 5, sub. t. 16 (1833). (1833), "var. *Coraiensis.*" Of this variety two forms may be distinguished.

Panax schin-seng var. **coraiense** f. **spontaneum** Nakai, forma nova.

Rhizoma plus minus cylindrice elongatum.

In silvis Koreae sept. et mediae rarum.

Panax schin-seng var. **coraiense** f. **cultum** Nakai, f. nova.

Rhizoma brevissimum.

In agris Japonicis et Koreanis colitur.

Although *Panax Ginseng* C. A. Meyer is the best name for the Korean Ginseng, *P. schin-seng* precedes it by ten years. *Panax schin-seng* has three varieties of which two belong really to two distinct species. When a species is subdivided into varieties by an author such as a, b, c or 1, 2, 3 or giving names of their own and the co-ordinate descriptions are followed it is natural to adopt the first variety for the type. *Panax schin-seng* is one of these cases and moreover it is furnished with colored plates which no one can mistake for any other species. This is the reason why the name *Panax schin-seng* is adopted here.

The author started this investigation at the Tokyo Imperial University and finished it at the Arnold Arboretum of Harvard University. He wishes to express his great appreciation of Professor Sargent's courtesy in allowing him to avail himself freely of the library and the herbarium of that institution. The author wishes also to thank Mr. E. H. Wilson for useful help and to Miss Tucker for her courteous assistance in the library. And he wishes especially to emphasize his sense of gratitude toward Mr. Rehder for his valuable criticisms and suggestions.

EHRETIAE QUAEDAM NOVÆ ASIATICAE

T. NAKAI

"The Chinese specimens [of *Ehretia acuminata*] agree well with Bentham's full description of Brown's species, and in the absence of Australian material of the typical plant there is nothing to be done but to follow Clarke and others in referring the Asiatic plant to Brown's species. Nevertheless, I am sceptical as to the two being conspecific, since such distribution is contrary to all we know of Chinese woody plants."

This is a note by Mr. E. H. Wilson when he enumerated the Chinese *Ehretia* in Sargent's Plantae Wilsonianae. Agreeing in this opinion I have lately studied all the material of *Ehretia acuminata* and of the allied species in the Arnold Arboretum Herbarium. Fortunately I have been able to see both flowering and fruiting specimens of *Ehretia acuminata* from Australia and of the related species. They are indeed closely related but have some remarkable distinctive characters. The most important character distinguishing *E. acuminata* from allied species is the shape of the anthers. In *E. acuminata* they are roundish and the connective is not produced while in the other species they are oblong and the connective exceeds the anther-tips. Next to the shape of the anthers, the pubescence and the persistence of the leaves, the color and nature of the fruits are prominent characters of the group. According to these characters the species may be distinguished as follows:—

Folia subtus pubescentia vel pilosa.

Folia supra glabra, subtus pubescentia, ovata vel ovato-rotundata, remote et minute serrulata, basi rotundata. Fructus maturi rubri..... *E. pilosula.*

Folia supra scaberulo-pilosella, subtus pilosella vel subglabra, oblonga vel oblongo-obovata, per totam longitudinem serrulata, basi rotundata vel acuta vel subcordata. Fructus maturi ignoti.....*E. polyantha.*

Folia subtus praeter axillas venarum glaberrima.

Antherae rotundatae vel late ovatae, connectivo loculos antherae non superante. Ramulus biennis rubro-fuscescens. Folia lanceolato-acuminata vel ovato-acuminata. Fructus rubri.

Folia margine per totam longitudinem minute serrulata.
E. acuminata.

Folia margine remote serrulata interdum subintegra.
E. acuminata var. *laxiflora.*

Antherae oblongo-ovatae vel oblongae apiculatae. Ramulus biennis fuscus vel cinereo-fuscescens. Folia lanceolato-acuminata vel ovato- vel elliptico-acuminata.

Folia hieme decidua minute serrulata vel subcrenulato-serrata. Fructus aurei v. aurantiaci.

Folia vulgo obovata interdum elliptica, vulgo utrinque attenuata.
E. thyrsiflora.

Folia vulgo elliptica, crenulato-serrata.....*E. thyrsiflora* var. *latifolia.*

Folia per hiemem persistentes. Fructus aurantiaci vel rubri.

Fructus maturi aurantiaci, non edules. Folia oblonga vel anguste oblonga, apice mucronata vel acuminata, crenato-serrata, adulta utrinque glabra, basi acuta vel rotundata vel truncata.....*E. taiwaniana.*

Fructus maturi rubri, edules.

Folia lanceolata vel oblongo-lanceolata basi acuta v. acuminata, aequaliter serrulata.....*E. serrata.*

Folia ovata vel elliptica, subirregulariter serrulata, basi rotundata vel acuta.....*E. serrata* var. *pyrifolia.*

Ehretia pilosula F. Mueller in Fragm. Phytogr. Austral. v. fasc. xxxiv. 20 (1865).

Australia.

Specimen non vidi.

Ehretia polyantha A. de Candolle, Prodr. ix 503 (1845).

Ehretia virgata Blanco, Fl. Filip. 127 (1837), non Swartz.

Ehretia Onava A. de Candolle Prodr. ix. 511 (1845).

Ehretia acuminata Vidal y Soler, Rev. Pl. Vasc. Filip 193 (1886).—Robinson in Philipp. Journ. Sci. iv. 690 (Philipp. Borag.) (1909).—Merrill, Spec. Blanc. 328 (1918).

Philippine Islands: (Mindanao, Luzon, Negro Isl.).

This is an evergreen tree flowering from October to March, the fruits ripening from May to June. The leaves are comparatively large among the species of this group and are very often subcordate at base. The inflorescence is large and always scabrous.

Ehretia acuminata R. Brown, Prodr. Fl. Nov. Holland. 497 (1810).—A. de Candolle, Prodr. ix. 503 (1845).—Bentham, Fl. Austral. iv. 387 (1869).—F. Mueller, Fragm. Phytogr. Austral. ix. 122 (1875).—Betche, Handb. Fl. New South Wales, 362 (1893).—M. Bailey, Queensl. Fl. iv. 1038 (1901), excl. syn. *E. serrata.*

Australia.

Ehretia acuminata var. **laxiflora** Bentham Fl. Austral. iv. 388 (1869).—M. Bailey, Queensl. Fl. iv. 1038 (1901).

Australia.

This is nearest to *Ehretia serrata*, but the color of the twigs is different. I saw specimens[1] taken from a tree cultivated in the Botanic Garden, at Buitenzorg, Java. It seems different from either *E. serrata* or *E. acuminata*, but the material is not sufficient to decide this. According to F. Mueller (l. c.) the leaves of *E. acuminata* are deciduous, but I think this is a mistake. The flowering specimens in the Arnold Arboretum Herbarium were collected in the garden of Palace Grounds of Sydney in April and the fruiting specimen on the Blackall Range in January. They show that the flowers appear in autumn and fruit ripens in summer, the leaves remaining through the winter.

Ehretia thyrsiflora Nakai, Trees Shrubs Jap. I. 327, fig. 179 (1922); Fl. Sylv. Kor. XIV. 20, t. 4 (1923).

Ehretia serrata β. *obovata* Lindley in Bot. Reg. XIII. nota sub tab. 1097 (1827).
Cordia thyrsiflora Siebold & Zuccarini in Abh. Akad. Muench. IV. pt. III. 150 (Fl. Jap. Fam. Nat. II. 26) (1846).
Ehretia serrata Franchet & Savatier, Enum. Pl. Jap. I. 333 (1875); non Roxburgh.
Ehretia acuminata Hemsley in Jour. Linn. Soc. XXVI. 143 (Ind. Pl. Sin.) (1890), pro parte.—Diels in Bot. Jahrb. XXIX. 545 (Fl. Centr. China) (1900).—Pampanini in Nuov. Giorn. Bot. Ital. n. ser. XVII. 699 (1910).—Wilson in Sargent, Pl. Wilson. III. 362 (1916), pro parte.—Non R. Brown.
Ehretia ovalifolia Hasskarl, Cat. Hort. Bogor. 137 (1844); non Wight.
Ehretia acuminata v. *grandifolia* Pampanini, Nuov. Giorn. Bot. Ital. n. ser. XVII. 699 (1910).

KYUSHU: Osumi province: circa Kirishima, *R. Yatabe*.

FORMOSA: Takou, (*A. Henry*, no. 1135).

CHINA. Shangtung: Yen Miao, *J. Hers*, no. 1924. Honan: monte Yii Tai Shan, *J. Hers*, no. 282. Hupeh: Ichang, *E. H. Wilson*, no. 74; Hsing-Shan-Hsien, *E. H. Wilson*, no. 74A; Changyang Hsien, *E. H. Wilson*, no. 819, 1103; sine loco, *A. Henry*, no. 6358. Kiangsu: Huang Tsang Yii, *J. Hers*, no. 1001. Hunan: inter urbes Tsingtschon et Wukang, *H. Handel-Mazzetti*, no. 340. Yunnan: Szemao, *A. Henry*, no. 10545.

J. Hers no. 1924 agrees with Pampanini's variety *grandifolia*, which is based on a vigorous branch of a young tree.

Ehretia thyrsiflora var. **latifolia** Nakai, Trees Shrubs Jap. I. 329 (1922).

Folia elliptica crenulato-serrata.

KYUSHU: in monte Sobosan, *H. Sakurai*.

This is a distinct variety found only in the northern part of Kyushu and in western Hondo.

Ehretia taiwaniana Nakai, sp. nov.

Ehretia acuminata Hemsley in Jour. Linn. Soc. XXVI. 144 (Ind. Fl. Sin.) (1890), pro parte.—Henry in Trans. Asiat. Soc. Jap. XXIV. suppl. 62 (List Pl. Formosa) (1896).—Matsumura in Tokyo Bot. Mag. XII. 83 (1898).—Matsumura & Hayata, Enum. Pl. Formos. 253 (1906).—Matsumura, Ind. Pl. Jap. II. pt. II. 524 (1912), pro parte.—Dunn & Tutcher, Fl. Kwangtung 177 (1912).—Gagnepain & Courchet in Lecomte, Fl. Gén. Indo-chine, IV. 209 (1914).—Wilson in Sargent, Pl. Wilson. III. 363 (1916), pro parte.—Kanehira, Formos. Trees, 381 (1918).—Non R. Brown.

[1] Vide *Ehretia acuminata* Koorders & Valeton, Boomsort. Java, VII. 74 (1900), et *Ehretia serrata* Koorders, Excursionsfl. Java, III. 127 (1912).

Arbor mediocris. Cortex trunci griseus, longitudine fissus. Folia et inflorescentia juvenilia saepe pilosa sed demum glabrescentia; ramuli glabri teretes, biennes, grisei vel fusco-grisei. Petioli glabri, 7–30 mm. longi, supra canaliculati, virides; lamina nutans, oblonga v. elliptica, apice acuta vel mucronata vel attenuata, basi acuta vel rotundata vel subcordata, 2–14.5 cm. longa, 0.7–7.5 cm. lata, subcoriacea, supra glabra vel sparsissime scaberulo-ciliata secus venas primarias adpresse ciliata, margine crenulato-serrata vel interdum subintegra vel subduplicato-serrata. Inflorescentia erecta terminalis thyrsoidea, basi nuda vel foliosa, 3–20 cm. longa, ramis primo pilosis sed glabrescentibus; flores densi sessiles vel brevissime pedicellati, suaveolentes; calyx 5-lobus, lobis 1.5 mm. longis orbicularibus vel ovato-orbicularibus margine ciliolatis; corolla alba, tubo incluso vel subexserto, lobis oblongis obtusis reflexis 2–3 mm. longis; stamina exserta; antherae ovato-oblongae, albae, apiculatae; styli apice bifidi. Bacca parva sphaerica, aurantiaca, inedulis; pyrenae 1–2.

FORMOSA: Bankinsing, *A. Henry*, nos. 506, 443; Takow, *A. Henry*, nos. 1874, 1778, 1778a; South Cape, *A. Henry*, nos. 952, 922; in silvis Maruyama, *U. Faurie*, no. 303; in silvis Paehiran, *U. Faurie*, no. 302; Pinan, *E. H. Wilson*, no. 11133.

LIUKIU: Naha insulae Okinawa, *E. H. Wilson*, no. 8018.

CHINA. Kwangtung: circa Canton, *C. O. Levine*, no. 446. Yunnan: via Peyentsin ad Tatienkai, *Siméon Ten*, no. 310. Kwangsi: Ta Yu Hsien, *H. H. Hu*, no. 964. Hupeh: Ma-pan-sciah, 1000 m., *C. Silvestri*, no. 1919.

This is a subtropical evergreen tree. It is the subject of Wilson's photograph no. 3307.

Ehretia serrata Roxburgh, Hort. Bengal. 17 (1814), nom. nud.; Fl. Ind. ed. Carey, II. 340 (1824); Fl. Ind. ed. 2, I. 596 (1832).—Lindley in Bot. Reg. XIII. t. 1097 (1827).—A. de Candolle, Prodr. IX. 503 (1845).—Brandis, Forest Fl. Ind. 339 (1874).—S. Kurz, Forest Fl. Brit. Burma II. 210 (1877).—Gamble, List 37 (1878); Man. Ind. Timbers, 272 (1881).

Ehretia acuminata C. B. Clarke in Hooker f. Fl. Brit. Ind. IV. 141 (1883) excl. syn. *E. ovalifolia* et *Cordia thyrsiflora*.—Brandis, Ind. Trees, 481 (1906).—Kanjilal, Forest Fl. Siwalik et Jaunsar, 296 (1911). Gamble, Man. Ind. Timbers, ed. 2, II. 503 (1922).

HIMALAYA, KHASIA, BENGAL, CHITTAGONG, UPPER BURMA.

Ehretia serrata var. **pyrifolia** A. de Candolle, Prodr. IX. 503 (1845).

Ehretia pyrifolia D. Don, Prodr. Fl. Nepal. 102 (1825).

BENGAL et NEPAL.

This also is an evergreen tree. The flowers appear from March to June; the fruits ripen from May to November.

Ehretia Dicksoni Hance in Ann. Sci. Nat. sér. 4, XVIII. 224 (1862).

Ehretia macrophylla Hemsley in Jour. Linn. Soc. XXVI. 145. (Ind. Fl. Sin.) (1890).—Henry in Trans. Asiat. Soc. Jap. XXIV. suppl. 62. (List Fl. Formosa) (1896).—Matsumura in Tokyo Bot. Mag. XII. 83 (1898).—Diels in Bot. Jahrb. XXIX. 545 (1900).—Matsumura & Hayata in Jour. Coll. Sci. Tokyo XXII. 254 (Enum. Pl. Formos.) (1906).—Pampanini in Nuov. Giorn. Bot. Ital. n. ser. XVII. 699 (1910).—Bean, Trees Shrubs Brit. Isl. I. 504 (1914).—Wilson in Sargent, Pl. Wils. III. 364 (1916), pro parte, excl. syn. *Ehretia corylifolia*.—Non Wallich.

Haec species ab *E. macrophylla* floribus corymbosim dispositis dignoscenda.

Ehretia Dicksoni has been often mistaken for *E. macrophylla* from which it differs in its racemosely arranged flowers on the branchlets of the inflorescence. Mr. E. H. Wilson tells me he is now of the opinion that *Ehretia Dicksoni* is distinct from the Himalayan *E. macrophylla*. He saw many plants of *E. Dicksoni* in Paris where it is quite hardy and flowers and fruits freely and is considered a good tree to plant in streets where small trees are desired. *Ehretia Dicksoni* is a variable plant and its varieties may be distinguished as follows.

Folia subtus tota petiolisque velutina, late elliptica vel ovata vel ovato-rotundata.
Inflorescentia velutina. Corolla extus griseo-ciliata...*E. Dicksoni* var. *tomentosa*.
Folia subtus saltem ad costae basin et petiolum pilosa vel glabra.
Folia subtus distincte velutina.
Folia subtus praeter basin costae velutina.....*E. Dicksoni* var. *liukiuensis*.
Folia subtus ad costam et venas primarias glabra...*E. Dicksoni* var. *japonica*.
Folia subtus adpresse pubescens vel subglabra.
Folia subtus adpresse pubescentia.....*E. Dicksoni* var. *typica*.
Folia subtus subglabra.....*E. Dicksoni* var. *glabrescens*.

Ehretia Dicksoni var. **typica** Nakai.

Folia late ovata vel obovata vel oblongo-obovata vel oblonga, apice acuta vel obtusa, basi acuta vel rotundata vel subcordata, supra scabra, infra molliter sparsim pubescentia. Inflorescentia sparsim pilosella. Corollae lobi extus glabri vel piloselli.

CHINA. Kiangsu: Nanking, *F. N. Meyer*, no. 1415. Honan: Yii Tai shan, *J. Hers*, no. 275; Cheng Chow, *J. Hers*, no. 69. Kiangsi: prope Kuling, *E. H. Wilson*, no. 1571. Hupeh: Outanscian, *C. Silvestri*, no. 1925; Ichang, *E. H. Wilson*, nos. 3554A et 84; San-scien, *C. Silvestri*, no. 1923. Szechuan: sine loco speciali, *C. Bock & A. v. Rosthorn*, no. 2364.

FORMOSA: Takow, *A. Henry*, no. 313; South Cape, *A. Henry*, no. 323; Bankingsing, *A. Henry*, sine numero; Tentana, *E. H. Wilson*, no. 10306.

Ehretia Dicksoni var. **glabrescens** Nakai, var. nov.

Ehretia macrophylla Wilson in Sargent, Pl. Wilson III. 364 (1916), pro parte; non Wallich.

Folia subtus praeter venas primarias sparsissime pilosellas glabra. Rami inflorescentiae glabri; corolla extus glabra.

CHINA. Hupeh: Ichang, *E. H. Wilson*, nos. 3554, 3554B. Yunnan: Mengtze, *A. Henry*, no. 10515.

Ehretia Dicksoni var. **liukiuensis** Nakai, var. nov.

Folia rotundato-obovata vel subrotundata supra scabra, subtus velutina, costa basin versus glabra excepta. Inflorescentia pubescens; corolla extus adpresse pilosa.

LIUKIU: sine loco speciali (a Yokohama Nursery Co. commun.).

Ehretia Dicksoni var. **japonica** Nakai, var. nov.

Ehretia macrophylla Matsumura Ind. Pl. Jap. II. pt. II. 524 (1912), pro parte, planta Formosana excl.—Nakai, Trees, Shrubs Jap. I. 329, f. 180 (1922).

Folia subrotundata vel late elliptica, supra distincte scabra, subtus adpresse velutina, costis et venis primariis glabris. Inflorescentia sparsim pilosa; corolla extus glabra.

HONDO. Awa province: in monte Kiyozumi, *H. Sakurai.*

SHIKOKU. Awa province, Kaifu, *J. Nikai.*

Ehretia Dicksoni var. **tomentosa** Nakai, var. nov.

Ehretia macrophylla var. *tomentosa* Gagnepain & Courchet in Lecomte, Fl. Gén. Indo-Chine, IV. 212 (1914).

Folia rotundato-ovata vel late oblonga vel subrotundata, apice acuta, basi acuta vel rotundata vel subcordata, supra scabra, infra toto velutina. Inflorescentia velutina; corolla extus lanato-pilosa.

CHINA. Hainan, *Ford*, sine no.; Hoi how (comm. Hort. Bot. Hongkong, no. 2183).

Ehretia corylifolia *C. H. Wright* (in Kew Bull. Misc. Inform. 1896, 25) a specie praecedente perdistincta foliis basi vulgo cordatis ovato-acuminatis utrinque tenuiter pubescentibus, serrulis parvis, floribus corymboso-scorpioidibus. In Yunnan vulgaris.

NOTES ON NORTH AMERICAN TREES, XII[1]

C. S. SARGENT

Aesculus glabra var. **monticola**, n. var.

Differing from the type in its dwarf habit, small fruit and often 7 leaflets.

Leaves 5–7, usually 5-foliate, their petioles glabrous, 7–15 cm. in length; leaflets oblong-obovate to elliptic, abruptly or gradually narrowed and long-pointed at apex, cuneate at base, coarsely often doubly serrate with acuminate teeth, glabrous with the exception of a few short hairs early in the season on the upper side of the midrib and principal veins, 10–12 cm. long and 4.5–5 cm. wide, their petiolules glabrous or sparingly pilose, 1–10 mm. in length. Flowers rather smaller but otherwise as in the type. Fruit subglobose, 1.5–2 cm. in diameter, usually 1-seeded; seeds subglobose or depressed and often nearly twice as broad as high, dark chestnut brown and marked by an oval or nearly circular hilum 6–7 mm. long.

A shrub 1–2 m. tall.

OKLAHOMA: La Flore County, northern slopes near the top of Rich Mountain at an altitude of 500 m. near Page, *E. J. Palmer*, no. 20967 (type), April 27, 1922, no. 21634, June 1, 1922, (with shorter, broader and more coarsely serrate leaflets, slightly scabrate above and more pubescent on the upper side of the midrib and veins and furnished below with small tufts of pale axillary hairs) and October 8, 1922, (fruit only).

From *Aesculus glabra* var. *micrantha* Sargent, the shrubby variety from Fulton, Arkansas, the Oklahoma shrub differs in its more pubescent

[1] For part XI, see vol. IV,

leaflets and much larger flowers. In the number of leaflets and in their shape and serratum it is nearer to the var. *Buckleyi* Sarg. than to the type.

× **Aesculus arnoldiana** (*A. glabra* × *A. hybrida*), n. hyb.

Leaves 5-foliolate, their petioles deeply grooved on the upper side, puberulous toward the apex, 8–15 cm. in length; leaflets elliptic, long-pointed and acuminate at apex, cuneate at base, finely, often doubly serrate, sparingly floccose-pubescent early in the season becoming glabrous or nearly glabrous above, pubescent along the under side of the midrib and of the from fifteen to twenty pairs of primary veins furnished in their axils with conspicuous tufts of pale hairs, dull dark green on the upper surface, pale yellow-green on the lower surface, 9–14 cm. long and 4–5 cm. wide; petiolules pubescent or puberulous, 5–10 mm. in length. Flowers mostly unisexual by abortion of the ovary, yellow, opening the end of May, on slender pubescent pedicels, in short broad densely flowered clusters, pubescent like the short peduncle; calyx campanulate, slightly pubescent; petals villose and glandular on the margin, those of the upper pair marked with red; stamens nearly as long or slightly longer than the petals, sparingly, villose. Fruit roughened by the scattered prickles and occasional by their bases, subglobose, 2–3 cm. in diameter, 1–3-seeded; seeds light chestnut-brown, up to 2 cm. in diameter, hilum 5–6 mm. in diameter.

This tree which sprung up several years ago in the Aesculus Group of the Arboretum in the immediate neighborhood of flowering plants of its supposed parents is a tree from 6.5 to 7 m. high with a slender trunk covered with pale scaly bark. In general appearance it might be taken for a plant of *A. glabra* from which it differs in the shorter stamens, smaller only slightly roughened fruit and in the presence of glands mixed with the hairs on the margin of the petals showing the influence of one of the Eupaviae. None of the species of this group had flowered in the Arboretum when the seed which produced this tree germinated and the glands on the margin of the petals can only be accounted for by the influence of *A. hybrida* D. C., a hybrid it is believed between *A. Hippocastanum* and *A. Pavia*, one of the red-flowered Eupaviae.

Aesculus octandra var. **vestita**, n. var.

Differing from the type in the coating of pale tomentum or pubescence on the lower surface of the leaflets and on the petioles and branchlets. This form of the yellow flowered Buckeye which is widely distributed with the species appears to be more abundant westward than on the southern Appalachain Mountains where *Aesculus octandra* grows to its largest size and is most abundant.

In the herbarium of this Arboretum are the following specimens of this variety:

NORTH CAROLINA. Roan Mt., *Gray, Sargent, Redfield* and *Canby*, June 19, 1879; Buncombe County, Craggy Mt., *T. G. Harbison*, Sept. 7, 1906.

West Virginia. Mercer County, near Princeton, *T. G. Harbison*, September 7, 1906; Munroe County, Sweet Springs, *C. S. Sargent*, August 13, 1910; Greenbriar County, White Sulphur Springs, *J. S. Ames*, May 17, 1919.

Kentucky. Greenup County, Russell, no. 1566, October 2, 1922, May 2, 1923; Breathitt County, Portsmouth, no. 828, May 8, 1919; South Portsmouth, no. 828, May 8, 1919; Pike County, Pikeville, no. 947 (type), May 17, 1919, no. 1251, October 2, 1920; Boyd County, Ashland, no. 834, May 9, 1919, September 31, 1920; Lee County, Beatyville, no. 1145, May 20, 1920; Letchen County, Jenkins, 1315, September 24, 1921; all by *R. E. Horsey*.

Ohio. Scioto County, Portsmouth, *R. E. Horsey*, no. 460, September 21, 1915 and May 21, 1916.

Indiana. Crawford County, near Leavenworth, *C. C. Deam*, no. 18613, September 4, 1915; Dearborn, near Aurora, *C. C. Deam*, no. 16052, June 17, 1915.

Among cultivated plants the *Aesculus neglecta* Baenitz (Herb. Dendr. without number "Breslau: Goepperthain, 1903"), not Lindley, and Hort. Goettingen, *A. Rehder*, no. 1571, belong to this variety.

It has been cultivated in the Arboretum since 1898 when a plant was received from the Meehan Nursery at Germantown, Penn. (no. 8121); in 1900 a plant was received from the Spaeth Nursery at Berlin, Germany (no. 8123); and in 1907 the seeds collected on Craggy Mountain, North Carolina, by T. G. Harbison, produced a number of plants (no. 13276).

The covering of the lower surface of the leaflets of the tree from Pikeville, Kentucky, (Horsey no. 947), is distinctly tomentose, and similar tomentum occurs on several of the other specimens in this herbarium. On other specimens the lower surface of the leaflets is pubescent, sometimes only slightly so, showing the transition to the normal form of *Aesculus octandra* in which the lower surface of the leaflets is glabrous or occasionally slightly pubescent early in the season with deciduous hairs except along the under side of the midrib and principal veins. The amount of the pubescence on the petioles and branchlets also varies in different individuals.

Aesculus neglecta Lindley in Bot. Reg. xii. t. 1009 (1826).—Spach in Ann. Sci. Nat. sér. 2, ii. 55 (1834).

Lindley's description of this species was made from a tree growing in the garden of the London Horticultural Society at Chiswick, which had been purchased from a Monsieur Catros of Bordeaux under the name *Aesculus ohioensis*. Spach took up Lindley's name and spoke of the tree as common in cultivation in 1834. Koehne in 1893 (Deutsche Dendr. 386) suggested that it was a hybrid of *A. discolor* and *A. octandra*, but the margins of the petals in Lindley's excellent plate show no trace of the glands among the hairs which indicate hybrid origin in Aesculus. The petals are pale yellow marked by small red blotches.

I have never seen a wild Buckeye with flowers which resemble those figured by Lindley, but Colonel Henry A. du Pont of Winterthur, Delaware, has recently called my attention to two trees planted by his grandfather the leaves and flowers of which cannot be distinguished from those represented by Lindley's plate.

Eleuthère Irénée du Pont de Nemours, the founder of the Dupont Family in America, came from France in 1800 to America where he lived first at Hackensack, New Jersey, but in July 1802 moved to Delaware where he established his powder works and built a substantial stone mansion on the banks of the Brandywine in Christiana Hundred, about four miles from Wilmington at the place which has now for one hundred and twenty-one years been known as Eleutherean Mills.

A family tradition, preserved by the now oldest Du Pont who as a boy gathered nuts from the trees, records the fact that Mr. Antoine Bidermann who had married Du Pont's second daughter Evelina and had become associated with him in the powder business had gone to New Orleans some time after 1820 to inspect there the agency of the powder mills and had returned home on horseback through Mississippi, Alabama and Georgia, and that during this journey he had picked up the nuts from which the Eleutherean Mills trees had grown.

The soil on the steep slope in the rear of the Du Pont mansion is deep and rich, as is shown by the size and vigor of the native Oak-trees which are growing in it, and the two large Buckeyes on this slope, the trees which in the color of their flowers so closely resemble the flowers of Lindley's plate, are 32 and 28 metres high with a trunk girth at 3 feet from the ground of 2.35 and of 2.10 metres. The larger of these two trees is the tallest and largest Buckeye of any variety of which authentic measurements have been made.

The conclusion which an examination of these Eleutherean Mills Buckeyes has forced on me is that there are no real characters by which the plant I have named *Aesculus georgiana* can be distinguished from the *Aesculus neglecta* of Lindley which, if this view is accepted, becomes the type of the species of the Octandrae which in various forms is widely distributed in the Piedmont region of North and South Carolina and northern Georgia, occasionally ascending the Blue Ridge in North Carolina to altitudes of 3000 feet, and is common in central Georgia, ranging east into Richmond County and south into northern and central Alabama, and to an isolated station near Pensacola in Florida.

It varies from a tree 17 or 20 metres tall to a shrub which flowers and produces abundant fruit when not more than 1 metre high. The leaflets of the type and of one variety are glabrous on the lower surface, but in one form they are pubescent, and on another densely tomentose. The flowers of *A. neglecta* are borne in elongated slender clusters, but in the plants now considered its varieties the flower-clusters are often short and crowded and the petals are yellow, more or less marked with red or entirely red.

I have not seen specimens of wild trees which exactly resemble the type of *A. neglecta* as represented in Lindley's plate and by the two large trees at Eleutherean Mills, but three specimens presented to the Arboretum herbarium by Mr. W. W. Ashe resemble the type in their narrow elongated flower clusters and in the size and shape of the yellow flowers which, however, are without the red markings of those of the type; these specimens can perhaps be referred to *A. neglecta* rather than to any of its varieties. Mr. Ashe's specimens are labeled "Aesculus sp. nov. Alamance County, N. C., near Saxapahaw, about June 1, 1900, W. W. Ashe;" "*A.* sp. nov. near Williamsville, Dunham County, N. C., May 13, 1904, and *Aesculus* sp. nov., Chapel Hill, N. C., April 20, 1915, sent me by Dr. Coker at my request from tree on the Hillsboro road, W. W. Ashe."

The more distinct forms of *Aesculus neglecta* may be arranged as follows:

Aesculus neglecta Lindley. Leaflets glabrous on the lower surface; flowers in elongated rather open clusters; petals pale yellow or nearly white, marked by small red blotches.

Aesculus neglecta var. **georgiana,** n. var.

Aesculus georgiana Sargent in Trees and Shrubs, II. 359, t. 197 (1913); Man. Trees N. Am. ed. 2, 706, f. 635 (1922).

Differing from the type in the shorter, broader and more densely flowered corymbs; in the typical form calyx red on the upper side and pale yellow on the lower side; petals bright yellow, passing into forms with entirely red or yellow flowers.

Usually a low broad shrub, occasionally a tree from 14 to 20 metres in height.

The type station for this variety is in De Kalb County, Georgia, near the base of Stone Mountain; it ranges northward in Georgia to the northern border of the state and is very abundant in Banks, Rabun and Habersham Counties; it occurs in Seneca and Oconee Counties, South Carolina, T. G. Harbison, no. 1, May 15, 1915, and nos. 7 and 9, April 9, 1918, and ranges northward in the Piedmont region to Durham County, North Carolina, T. G. Harbison, no. 6, April 22, 1918. It is the form which has been found in Alabama by C. Mohr, Madison Co., Mt. Sano, September 26, 1881, "large tree 80–85 feet high;" Tuscaloosa County, Tuscaloosa, rocky banks of the Warrior River, and in Eltowah County, Attalla, by T. G. Harbison, nos. 198, 209, October 8, 1910, "low shrub." It is this form with yellow flowers which occurs in western Florida near Pensacola growing as a small shrub, T. G. Harbison, April 11, 1915, March 21, 1916.

Aesculus neglecta var. **pubescens,** nov. comb.

A. georgiana var. *pubescens* Sargent in Trees and Shrubs, II. 259 (1913); Man. Trees N. Am. ed. 2, 706 (1922).

Differing from the type and from the var. *georgiana* in the pubescence covering the lower surface of the leaflets.

The type of this variety was raised at the Arboretum in 1905 from seeds collected by T. G. Harbison in De Kalb County, Georgia, near the base of Stone Mountain.

The following specimens in the Arboretum herbarium collected by T. G. Harbison are referred to this variety:

NORTH CAROLINA. Wake County, Raleigh, no. 7, April 21, 1918; Orange County, May 31, 1919; Macon County, Highlands, June 5, 1916.

SOUTH CAROLINA. Oconee County, Seneca, nos. 11, 6084, 6087, April 9, 1918, and April 29, 1922.

GEORGIA. Rabun County, no. 23, May 11, 1919, Clayton, May 10, 1914; Richmond County, near Augusta, *C. S. Sargent*, March 10, 1908, April 7 and 28, 1914; *T. G. Harbison*, no. 6081, April 28, 1912, nos. 1534, 1535, 1538, 1540, May 5, 1914, no. 6, October 5, 1914; De Kalb County, near Stone Mountain, *T. G. Harbison*, no. 661, September 7, 1911, nos. 905, 906, 907, April 30, 1912.

ALABAMA. Etowah County, Attalla, no. 200, October 8, 1910.

Aesculus neglecta var. **tomentosa**, n. var.

Differing from the type and from its vars. *georgiana* and *pubescens* in the thick coat of tomentum on the lower surface of the leaflets.

SOUTH CAROLINA. Oconee County, *T. G. Harbison*, nos. 6088, 6090, 6091, 6092, 6093, 6094, 6095, 6096, 6098, 6101, 6102, 6106, 6107, 6108, April 30, 1922.

This variety is an old inhabitant of European gardens where it has been cultivated as *Aesculus Michauxii* Hort., not Spach, *A. Lyonii* Hort., not Loudon, *A. discolor* Hort., not Pursh, *A. humilis* Hort., not Lindley, *Pavia discolor* in Herb. Kew Arb. 1010, not Pursh, *Pavia rubra* in Herb. Kew Arb. 3158, *A. rubra carnea superba*, Hort. Ellwanger & Barry, *A. rubra carnea pubescens*, Hort. Ellwanger & Barry.

Aesculus neglecta var. **lanceolata**, n. comb.

Aesculus georgiana var. *lanceolata* Sargent in Jour. Arnold Arb. II. 120 (1920); Man. Trees N. Am. ed. 2, 707, f. 636 (1921).

Differing from the type in the lanceolate to slightly oblanceolate long pointed leaflets.

A single tree from 25 to 30 feet in height, with bright red flowers. Rich woods, near Clayton, Rabun Co., Georgia, *T. G. Harbison*, no. 19, May 9, 1917.

× **Aesculus Du Pontii** (*Aesculus neglecta* × *Pavia*), new hyb.

Leaves 5-foliolate, their petioles slender, glabrous, 8–14 cm. in length; leaflets oblong-obovate to elliptic, abruptly long-pointed at apex, gradually narrowed to the cuneate base, acutely serrate, glabrous with the exception of tufts of pale hairs in the axils of the 18–25 pairs of slender veins, dark green on the upper surface, pale yellow-green on the lower surface, 15–19 cm. long and 5–8 cm. wide, with a thin yellow midrib; petiolules slender, glabrous, 5–10 mm. in length. Flowers appearing the middle of May up to 2 cm. in length, on slightly villose pedicels in narrow pubescent clusters 10–12 cm. in length; calyx narrow campanulate, red, eglandular, glabrous

or slightly villose at the base, petals yellow or yellow slightly tinged with red, their margins glandular and villose.

A tree 29.15 metres in height, with a trunk 2.25 metres in girth at one metre above the ground, covered with scaly bark, stout yellow branchlets and pale brown winter buds 2 cm. long.

This tree was planted by the fence near the right hand side (facing the house) of the entrance to Eleutherean Mills after 1820 by Eleuthère Irénée du Pont de Nemours and probably sprang from one of the seeds collected by Antoine Bidermann during his journey on horseback from New Orleans. This Buckeye, which is one of the most interesting of the trees which have been planted in the United States, may well preserve among tree lovers the name of a family which in at least four generations has made the neighborhood of Wilmington, Delaware, one of the chief centres of horticulture in the United States.

× **Aesculus DuPontii** var. **Hessei** (*A. neglecta georgiana* × *Pavia*), n. hybr.

Leaves 5-foliolate, their petioles stout, puberulous early in the season, 7–15 cm. in length; leaflets elliptic to slightly obovate, gradually narrowed and long-pointed at apex, cuneate at base, usually doubly serrate with slender slightly incurved teeth, glabrous, dark green above, lighter and yellow-green below, 10–13 cm. long and 4–5 cm. wide, with a prominent yellow midrib and from 20–25 pairs of slender primary veins often furnished with small tufts of axillary hairs; petiolules puberulous, 3–9 mm. long. Flowers appearing late in May, up to 3 cm. in length, red or yellow tinged with red, on short villose pedicels in compact densely crowded villose clusters 12 or 13 cm. long; calyx narrow-campanulate, slightly villose toward the apex, usually red, the petals yellow more or less tinged with red, villose and glandular on the margin.

This shrub was presented to this Arboretum in 1909 by the Hesse Nursery at Weener, Germany, with two other hybrid Buckeyes, under the name of *Aesculus* (*Pavia*) *nana rosea* "de semis." The presence of both hairs and glands on the margin of the petals indicates its hybrid origin. The leaves cannot be distinguished from those of *Aesculus Pavia*, while the inflorescence and the flowers only differ from those of *A. neglecta georgiana* in the rather narrower calyx and in the glands on the margin of the petals.

× **Aesculus mutabilis** Schelle in Beissner, Schelle & Zabel, Handb. Laubholz.-Ben. 323 (1903) = *A. discolor mollis* × *neglecta georgiana*.

Pavia mutabilis Spach in Ann. Sci. Nat. sér. 2, II. 57 (1834).
Aesculus discolor × *lutea* Koehne, Deutsch. Dendr. 386 (1893).
Aesculus Pavia mutabilis Hort. Spaeth.

This tree was well described by Spach, although the pubescence along the sides of the under surface of the midrib and in a lesser degree of the veins of the leaflets of the Arboretum plants presented by the Spaeth Nursery at Berlin, Germany, are not tomentosae on the veins as Spach de-

scribed it but villose. He failed, however, to notice the glands scattered among the hairs on the margin of the petals which indicate that it is a hybrid between a species of the Eupaviae and one of the Octandrae.

× **Aesculus mutabilis** var. **penduliflora** (*A. discolor mollis* × *neglecta*), n. hyb.

Leaves 5-foliolate, their petioles glabrous, 10–16 cm. long; leaflets oblong-lanceolate, acuminate and long-pointed at apex, gradually narrowed and cuneate at base, finely serrate with gland-tipped teeth, dark green and glabrous except on the midrib and veins above, pale and soft pubescent below, 12–16 cm. long, 4–5 cm. wide, with 22 or 24 pairs of primary veins; petiolules pubescent, 7–10 mm. in length. Flowers opening early in June, on slender glandular pedicels 5–10 mm. long, in narrow slightly pendent sparsely flowered densely pubescent clusters 14–16 cm. in length; calyx tubular, reddish covered with red glands, 5–6 mm. in diameter; corolla yellow, glandular, the margin of the petals covered with hairs mixed with glands. Fruit nearly globose, smooth with a thin pericarp; seed subglobose, dark chestnut brown and lustrous, 2–2.5 cm. in diameter, the hilum oblong or oval, 8–10 mm. in length.

As it grows in this Arboretum this is a narrow slender tree now about 8 metres in height, with a trunk 25 cm. in diameter covered with thin dark brown scaly bark; it was presented to the Arboretum in 1902 by the Spaeth Nursery near Berlin, Germany, under the name of *Aesculus humilis* × *lutea*.

The shape of the leaflets and the elongated flower clusters point to the typical form of *A. neglecta*, while the pubescence on the lower surface of the leaflets and the color of the flowers suggest that *A. discolor mollis* may have been the other parent. The long narrow leaflets and the elongated and pendent clusters of brilliant flowers make this one of the most distinct and beautiful of the hybrid Buckeyes.

× **Aesculus mutabilis** var. **induta** (*A. discolor mollis* × *neglecta*), n. hyb.

Differing from the type in the pale tomentum covering through the season the lower surface of the leaflets.

This variety is based on two of the three plants presented in 1909 to the Arboretum by the Hesse Nursery in Weener, Germany, as *Aesculus* (*Pavia*) *rosea nana* "de semis." It is probably the *Aesculus neglecta* Baenitz (Herb. Dendr. without number "Breslau: Südpark, 1905"), not Lindley. It was cultivated in 1904 in this Arboretum under the name of *A. octandra hybrida* (No. 1636–2) now dead.

CORRECTION

In the second edition of the Manual of the Trees of North America, 806 (December 1921), the Marlberry, a small tree of extreme southern Florida, was transferred from the genus Icacorea to Ardisia and called *A. paniculata* Nuttall. Nuttall, however, never made such a combination,

which must be credited to Sargent. The name, moreover, is not a valid one, having been used for another plant in 1814 by Roxburgh. The correct name for the Florida tree appears to be *Ardisia escallonioides* Chamisso & Schlechtendal in Linnaea, VI. 393 (1831). (See C. Mez, Myrsinaceae in Engler, Pflanzenr. IV.-236, 81 [1902]).

NEW SPECIES, VARIETIES AND COMBINATIONS FROM THE HERBARIUM AND THE COLLECTIONS OF THE ARNOLD ARBORETUM[1]

ALFRED REHDER

Xolisma Raf.

Xolisma Rafinesque in Am. Month. Mag. IV. 193 (1819).—Britton in Mem. Torrey Bot. Club, IV. 135 (1894).—Britton & Brown, Ill. Fl. U. S. Can. II. 569 (1897).—Small, Fl. S. E. U. S. 889 (1903); in N. Am. Fl. XXIX. 65 (1914).

Andromeda Linnaeus, Spec. 393 (1753), in part.

Lyonia Nuttall, Gen. I. 266 (1818).—Sprengel, Syst. II. 291 (1825).—Endlicher, Gen. 755 (1836–40).—De Candolle, Prodr. VII. pt. II. 599 (1839).—Bentham & Hooker, Gen. Pl. II. 587 (1876).—Drude in Engler & Prantl, Nat. Pflanzenfam. IV. 1, 44 (1889).—Fernald & Robinson in Gray's New Man. ed. 7, 635 (1908).—Not Rafinesque (1808), nor Elliott (1817).

In 1819 Rafinesque proposed the name Xolisma for Lyonia of Nuttall for the reason that the name Lyonia had been given by him in 1808 (in Med. Rep. N. Y. v. 353) to another genus, but that name was only a new name to replace Polygonella Michaux, which Rafinesque considered inappropriate; therefore it is not a valid name and will remain a synonym of Polygonella. There is, however, another Lyonia proposed in 1817 by Elliott (Sketch Bot. S. C. I. 316 [1817]) which antedates Lyonia of Nuttall and is a valid name for a new genus based on *Ceropegia palustris* Pursh (*Cynanchum angustifolium* Muhlb.); later the same genus was named Seutera by Reichenbach (Consp. 131 [1828]) and this name is taken up by Small, as according to the Philadelphia Code Lyonia Elliott is invalidated by the older homonym Lyonia Rafinesque of 1808, but according to the International Rules the latter name is not valid and therefore Lyonia Elliott remains the oldest and valid name for the genus of Asclepiadaceae, which makes it necessary to take up for Lyonia Nuttall the next oldest name which is Xolisma. The type species of this genus is *Lyonia ferruginea* Nuttall in which the character of the thickened sutures of the valves is most pronounced and the thickened part separates from the rest of the capsule, while in other species as in *X. ligustrina*, *X. mariana*, *X. lucida* and *X. ovalifolia* the thickened part, though clearly perceptible by its light color is apt to separate more irregularly from the rest of the valves and does not hold together so firmly like a separate valve as it does in *X.*

[1] Continued from vol. IV. p. 253.

ferruginea and its nearest relations. *Xolisma mariana*, *X. lucida* and *X. ovalifolia* have been referred by Bentham and Hooker and other authors to the genus Pieris, but they differ from that genus not only in the thickened sutures of the capsule, but also in the awnless anthers; apparently these authors did not consider the structure of the capsule and did not distinguish between appendaged or awned anthers and the appendaged filaments of these species; they considered the appendages of the filaments as equal in taxonomic importance to the awns of the anthers, but the former constitute a less constant character and the appendages may become more or less indistinct or obsolete and are entirely absent in some species of Xolisma as in *X. villosa*, while the awned anthers constitute a constant and important character.

Xolisma ligustrina Britt. var. **pubescens** Millspaugh, Liv. Fl. W. Virginia, 324 (1913).

Andromeda paniculata var. 2. *foliosiflora A. floribus subtomentosis* Michaux, Fl. Am.-Bor. 1. 255 (1803).
Andromeda tomentosa Dumont de Courset, Bot. Cult. ed. 2, III. 495 (1811).
Andromeda frondosa Pursh, Fl. Am. Sept. 295 (1814).
Lyonia frondosa Nuttall, Gen. 1. 267 (1818).
Andromeda ligustrina var. *pubescens* A. Gray, Syn. Fl. N. Am. II. pt. 1. 33 (1878).
? *Andromeda paniculata* var. *tomentosa* Dippel, l. c., in part.
Lyonia ligustrina var. *pubescens* Bean, Trees Shrubs Brit. Isles, II. 64 (1914).—Rehder in Bailey, Stand. Cycl. Hort. IV. 1935 (1915).
Arsenococcus frondosus Small, Shrubs Fla. 97 (1913); in N. Am. Fl. XXIX. 72 (1914), in part.

This variety is nearest to *X. ligustrina foliosiflora* C. Mohr, which in its typical form has nearly glabrous leaves lustrous above and usually a more leafy inflorescence with a nearly glabrous corolla (*Andromeda paniculata* var. 2, *foliosiflora* A. *floribus glabellis* Michaux, Fl. Am.-Bor. 1. 255 [1803]), while the variety has the leaves grayish above from a dense covering of short appressed hairs, becoming glabrescent at maturity, loosely or sparingly villose on the surface beneath and densely villose on the midrib and on the prominent veins; the inflorescence is usually less leafy and the corolla densely hairy with short stiff hairs except at the base. The specimen in this herbarium which shows these characters most markedly is from a cultivated plant collected by H. Zabel in the Botanic Garden at Muenden, Germany; this plant had been received in 1871 from the Booth Nursery at Flottbeck, Germany, under the name *Andromeda tomentosa* and is no doubt the plant described by Dumont de Courset under that name; by Kirchner (in Petzold & Kirchner, Arb. Muse. 468 [1864]) it was erroneously referred to *Xerobotrys tomentosa* Nuttall (= *Arctostaphylos tomentosa* Lindl.)

Xolisma lucida, comb. nov.

Andromeda lucida, Lamarck, Encycl. Méth. 1. 157 (1783).
Andromeda nitida Bartram apud Marshall, Arb. Am. 8 (1785).—Gray, Syn. Fl. N. Am. II. pt. 1. 32 (1878).
Andromeda coriacea Aiton, Hort. Kew. II. 70 (1789).—Sims in Bot. Mag. XXVIII. t. 1095 (1808).

Andromeda mariana Jacquin, Icon. Pl. Rar. III. t. 465 (1790), excl. synon.; not Linnaeus.
Andromeda myrtifolia Salisbury, Prodr. 290 (1796).
Andromeda marginata Veillard in Nouv. Duham. I. 188, t. 40 (1802).
Lyonia marginata D. Don in Edinb. New Philos. Jour. XVII. 159 (1834).
Leucothoe coriacea De Candolle, Prodr. VII. pt. II. 602 (1839), excl. synon.
Leucothoe marginata Spach, Hist. Vég. IX. 482 (1840).
Andromeda lacustris C. Wright in Sauvage, Anal. Acad. Ci. Habana, VI. 250 (1870).
Lyonia lucida K. Koch, Dendr. II. 118 (1872).—Blake in Rhodora, XVII. 132 (1915).
Pieris nitida Bentham & Hooker; Gen. Fl. II. 588 (1876).—Britton in Britton & Brown, Ill. Fl. II. 569, fig. 2769 (1897).
Andromeda obovata Rafinesque ex Gray, Syn. Fl. N. Am. II. pt. I. (1878), as synon.
Lyonia nitida Fernald in Rhodora, X. 53 (1908).—Robinson & Fernald, Gray's N. Man. 635 (1908).
Neopieris nitida Britton in Britton & Brown, Ill. Fl. ed. 2, II. 690 (1913).
Desmothamnus nitidus Small, Shrubs Fla. 96 (1913); in N. Am. Fl. XXIX. 64 (1914).
Pieris lucida Rehder in Mitteil. Deutsch. Dendr. Ges. XXIV. 226 (1915), not Léveillé (1906).

This species which is native to the coastal plain from Virginia to Florida and Louisiana and is also found in Cuba has been made by Small the type of the new genus Desmothamnus chiefly distinguished from typical Xolisma by the appendaged filaments and the pair of intra-marginal veins of its leaves, but the absence or presence of teeth or appendages near the apex of the filament does not seem to be a strong morphological character, and in some species these appendages though present become obsolete; it therefore does not seem wise to use this character for generic distinction.

Xolisma mariana, comb. nov.

Andromeda mariana Linnaeus, Spec. 393 (1753).—Gray, Man. 266 (1848); Syn. Fl. N. Am. II. pt. I, 32 (1878).
Andromeda pulchella Salisbury, Prodr. 289 (1796).
Andromeda mariana α. *ovalis* Sims in Bot. Mag. XXXVII. t. 1579 (1813).
Andromeda mariana β. *oblonga* Sims, l. c. sub t. 1579 (1813).
Lyonia mariana D. Don in Edinb. N. Philos. Jour. XVII. 159 (1834).—Robinson & Fernald, Gray's N. Man. 635 (1908).
Leucothoe mariana De Candolle, Prodr. VII. pt. II. 602 (1839).
Pieris mariana Bentham & Hooker, Gen. Pl. II. 588 (1876).—Britton in Britton & Brown, Ill. Fl. II. 569, fig. 2770 (1897).
Neopieris mariana Britton in Britton & Brown, Ill. Fl. ed. 2, II. 691 (1913).—Small in N. Am. Fl. XXIX. 65 (1914).

This species which is distributed from Rhode Island to Florida, Tennessee, Arkansas and eastern Texas has been made by Britton the type of the new genus Neopieris distinguished chiefly by the appendaged stamens a character which seems to be, as I have remarked under the preceding species, not of sufficient importance for generic distinction.

Xolisma mariana f. **vestita,** forma nov.

Recedit a typo ramulis annotinis, sepalis, foliis subtus satis dense villosis foliis supra sparsius sed ad costam et venas densius breviter villosis, pedicellis sparsius villosis.

TEXAS: Sandy Pine lands, Silsbee, Hardin County, *E. J. Palmer*, no. 9561, April 25, 1916 (type); Angelina County, *J. Reverchon*, no. 3863, May 5, 1903 (distributed as *Vaccinium corymbosum*).

This form is easily distinguished from the type by the soft pubescence of all its parts except the corolla; the leaves of the type specimen are generally elliptic-oblong and from 4 to 6.5 cm. long and 1.3 to 3 cm. wide. The branchlets, calyx and leaves of the typical form are glabrous or sometimes the midrib and veins on the under side of the leaves are slightly or rarely rather densely villous and the calyx is sometimes sparingly hairy, but none of the numerous specimens seen from the whole range of the species approach this new form in its densely villose pubescence. I have seen no other material of *X. mariana* from Texas and I find no record of its range extending as far west; the most western specimens seen are from Jefferson and Pulaski Counties in southeastern and central Arkansas (*E. J. Palmer*, nos. 8481 and 22999).

Xolisma ovalifolia, comb. nov.

Andromeda ovalifolia Wallich in As. Research, XIII. 391, fig. (1820); Cat. No. 763 (1828).—D. Don, Prodr. Fl. Nepal. 148 (1825).—Wight, Icon. IV. t. 1199 (1850).

Pieris ovalifolia D. Don in Edinb. Phil. Jour. XVII. 159 (1834).—De Candolle, Prodr. VII. pt. II. 599 (1839).—Clarke in Hooker, Fl. Brit. Ind. III. 460 (1882).—Rehder & Wilson in Sargent, Pl. Wilson. I. 552 (1913).

Lyonia ovalifolia Drude in Engler & Prantl, Nat. Pflanzenfam. IV. abt. I. 44 (1889).

Pieris pilosa Komatsu in Matsumura, Icon. Pl. Koisikav. III. 73, t. 182 (1916).

This species differs from the preceding in its lateral and occasionally terminal elongated racemes usually with a few leafy bracts near the base. In its typical form it inhabits the Himalayas from Kashmir to Bhutan and extends to Assam, Khasia and British Burma and to southwestern China, and Formosa.

Xolisma ovalifolia var. **lanceolata**, comb. nov.

Andromeda lanceolata Wallich in As. Research, XIII. 390, fig. (1820).—Wight, Icon. IV. t. 1198 (1850).

Andromeda squamulosa D. Don, Prodr. Fl. Nepal. 149 (1825).

Pieris lanceolata D. Don in Edinb. Phil. Jour. XVII. 159 (1834)—De Candolle, Prodr. VII. pt. II. 599 (1839).—Hance in Jour. Bot. XVI. 12 (1878).

Pieris ovalifolia var. *lanceolata* Clarke in Hooker f., Fl. Brit. Ind. III. 461 (1882).—Hemsley in Jour. Linn. Soc. XXVI. 17 (1889).—Rehder & Wilson in Sargent, Pl. Wilson. I. 552 (1913).

Pieris formosana Komatsu in Matsumura, Icon. Pl. Koisikav. III. 71, t. 181 (1916).

This variety differs chiefly in the narrower leaves, usually broadly cuneate at base or sometimes rounded and in the longer and narrower greenish sepals. It seems to have about the same range as the type.

Xolisma ovalifolia var. **elliptica**, comb. nov.

Andromeda elliptica Siebold & Zuccarini in Abh. Akad. Munch. IV. pt. III. 126 (Fl. Jap. Fam. Nat. II. 2) (1846).—Schneider, Ill. Handb. Laubholzk. II. 532, fig. 346 p-r, 347 e-g (1911).

Andromeda ovalifolia Miquel in Ann. Mus. Bot. Lugd.-Bat. I. 30 (1863).—Maximowicz in Bull. Acad. Sci. St. Pétersb. XVIII. 50 (1872); in Mél. Biol. VII. 620 (1872).—Non Wallich.

Pieris ovalifolia Hemsley in Jour. Linn. Soc. xxvi. 17 (1889), in part.—Diels in Bot. Jahrb. xxix. 515 (1900).—Shirasawa, Icon. Ess. For. Jap. ii. t. 60 (1910).—Non Don.

Lyonia ovalifolia Pampanini in Nuov. Giorn. Bot. Ital. n. ser. xvii. 683 (1910); non Drude.

Pieris ovalifolia var. *elliptica* Rehder & Wilson in Sargent, Pl. Wilson. i. 552 (1913).

Pieris elliptica Nakai in Tokyo Bot. Mag. xxxiii. 207 (1919); Trees Shrubs Jap. i. 149, fig. 87 (1922).

This variety differs chiefly in its thinner leaves and smaller fruits (3–4 mm. in diameter) from the type which has coriaceous leaves and larger fruits 4–5 mm. in diameter; none of the other characters given by Siebold & Zuccarini to distinguish the Japanese plant from that of the Himalayas holds. This variety is widely distributed through China except in the northern provinces and is also common in central and southern Japan.

Xolisma villosa, comb. nov.

Andromeda villosa Wall. Cat. No. 762 (1828), nomen nudum.

Pieris villosa Hooker f. apud Clarke in Hooker f., Fl. Brit. Ind. iii. 461 (1882).—Dunn in Jour. Linn. Soc. xxxix. 476 (1911).—Rehder & Wilson in Sargent, Pl. Wilson. i. 553 (1913).

? *Pieris Henryi* Léveillé in Bull. Soc. Bot. France liii. 204 (1906); in Fedde, Rep. Spec. Nov. iii. 262 (1906).

This species is very similar in general appearance and in most of its characters to the preceding species but is easily distinguished by the pubescence on the under side of the leaves, by the shorter inflorescence, by the lanceolate longer calyx-lobes divided nearly to the base and by the absence of the appendages of the filaments. It occurs at altitudes of from 3000–4000 m. on the Himalayas from Ghurwal to Sikkim and also in western China as far north as western Szechuan. Judging from the description I have little doubt that Léveillé's *Pieris Henryi* belongs here.

Xolisma villosa var. **pubescens,** comb. nov.

Pieris ovalifolia var. *pubescens* Franchet in Nouv. Arch. Mus. Paris, sér. 2, x. 44 (Pl. David. ii. 82) (1887).

Pieris villosa var. *pubescens* Rehder & Wilson in Sargent, Pl. Wilson. i. 554 (1913).

This variety differs from the type in its pubescent ovary and is known only from western Szechuan.

Xolisma compta, comb. nov.

Pieris compta W. W. Smith & J. F. Jeffrey in Not. Bot. Gard. Edinb. ix. 116 (1916).

Of this species I have not seen the type but a specimen collected in the Yunnan Fu district by O. Schoch (No. 145) and determined as *P. compta* by Schneider agrees well with the original description except that the calyx-lobes are ovate and obtuse rather than ovate-lanceolate and acutish and the ovary is ovoid and not depressed globose; the longest leaves of Schoch's specimen are up to 3.5 cm. long and the minute dots of the under side are not black. The general appearance of the plant suggests a species belonging in the affinity of *X. ovalifolia* and an examination of the stamens confirms this opinion; the anthers are without awns or appendages, not

biaristate as described by the authors, but the filaments have near the apex back of the anther-cells a pair of appendages in shape and size like those of *P. ovalifolia*. Of *Pieris bracteata* W. W. Smith I have seen no specimens but from the statement "filamentis . . . apice biaristatis" I infer that it also belongs to Xolisma. *Pieris Forrestii* Craib is a true Pieris and so is *P. polita* W. W. Smith & J. F. Jeffrey to which I refer one of Dunn's specimens collected in Fokien (Hongkong Herb. No. 2894). Of the numerous species of Pieris proposed by Léveillé I have seen no material and his descriptions are too incomplete to be guided by them. But I may say that *P. Bodinieri* appears to be a true Pieris judging from his drawing (in his Cat. Pl. Seutchouen, t. 24 [1918]) and that his *P. Henryi* probably belongs to *Xolisma villosa;* some of his species may not belong to the Andromedeae at all, but to Vaccinium as his *P. coreana* and *P. Fauriei* which according to Dr. Nakai who has seen the type specimens are both *Vaccinium bracteatum*, or they belong to other Ericaceous genera.

The species of Xolisma may be divided into several well marked groups as follows:

Xolisma Raf.

Sect. I. LYONIA, comb. nov.

Andromeda Walter, Fl. Car. 137 (1788), as to *A. ferruginea*.
Lyonia Nuttall, Gen. I. 266 (1818), in part; not Rafinesque (1808) nor Elliott (1817).
Xolisma Rafinesque in Am. Month. Mag. IV. 193 (1819).
Lyonia sect. 1. Bentham & Hooker, Gen. Pl. II. 588 (1876).
Andromeda sect. 5. *Lyonia* Gray, Syn. Fl. II. pt. I. 32 (1878).
Lyonia Subgen. 3. *Eulyonia* K. Koch, Dendr. II. pt. I. 119 (1872), in part.—Drude in Engler & Prantl, Nat. Pflanzenfam. IV. abt. I. 44 (1889).

This section, the type of which is *Lyonia ferruginea* Nuttall = *X. ferruginea* A. Heller, is characterized by the flowers being borne in dense axillary panicles, by the unappendaged filaments and the lepidote indumentum; the leaves are persistent and often toothed or undulate; the capsule is usually ovoid, prominently angled and the thickened part of the sutures separates as a whole from the rest of the capsule. Its many species (24 being enumerated by Small in N. Am. Fl. XXIX. 65–72), are mostly natives of the West Indies; two occurring in the southeastern United States and a few in Mexico.

Sect. II. ARSENOCOCCUS, sect. nov.

Vaccinium Linnaeus, Spec. 351 (1753), as to *V. ligustrinum*.
Andromeda Lamarck, Encycl. Méth. I. 158 (1883), as to *A. racemosa*.
Lyonia Nuttall, Gen. I. 266 (1818). in part, excl. species typica.
Andromeda sect. *Lyonia* Gray, Man. 265 (1848); Syn. Fl. II. pt. I. 32 (1878), in part.
Lyonia Subgen. *Eulyonia* K. Koch, Dendr. II. pt. I. 119 (1872), in part.
Lyonia sect. 2. Bentham & Hooker, Gen. Pl. 588 (1876).
Arsenococcus Small in Small & Carter, Fl. Lancaster Co. 218 (1913).

This section, the type of which is *Vaccinium ligustrinum* L. = *X. ligustrina* Rehd., is characterized chiefly by its flowers being borne in terminal panicles, by the unappendaged filaments, the absence of the lepidote indumentum, by the depressed-globose capsule not prominently angled and

with less thickened sutures; the leaves are deciduous and glabrous or pubescent. This section contains only one variable species native to the eastern States of North America distributed from Maine to Florida and Louisiana. The sectional names Lyonia and Eulyonia cannot be used, as these sections do not contain the type of Lyonia which is *L. ferruginea* G. Don and belongs to the preceding section.

Sect. III. Maria, comb. nov.

Andromeda Linnaeus, Spec. 393 (1753), in part.
Lyonia D. Don in Edinb. N. Phil. Jour. xvii. 159 (1834), in part.
Leucothoe sect. ii. *Maria* De Candolle, Prodr. vii. 602 (1839).
Andromeda § *Maria* Gray, Man. 266 (1848).
Andromeda § *Pieris* Gray, Man. ed. 2, 254 (1856).
Lyonia subgen. *Pieris* K. Koch, Dendr. ii. pt. i. 116 (1872), excl. *L. pulverulenta*.
Pieris sect.4 *Maria* Bentham & Hooker, Gen. Pl. ii. 588 (1876).
Lyonia Untergatt. V. *Maria* Drude in Engler & Prantl, Nat. Pflanzenfam. iv. abt. i. 44 (1889).
Neopieris Britton in Britton & Brown, Ill. Fl. ed. 2, ii. 690 (1913).
Desmothamnus Small, Shrubs Florida, 96 (1913).

This section, the type of which is *Andromeda mariana* L. = *X. mariana* Rehd., is chiefly characterized by the flowers borne in axillary clusters on the branches of the previous season, by the appendaged filaments, the ovoid or globose-ovoid capsule with prominently thickened sutures; the leaves are entire, persistent or deciduous and glabrous, rarely puberulous or pubescent. The two species are native of eastern North America and are distributed from Rhode Island to Florida and Louisiana; one of the species is also found in Cuba.

Sect. IV. Pieridopsis, nom. nov.

Andromeda Wallich in As. Research. xii. 391 (1820).
Pieris D. Don in Edinb. New Philos. Jour. xvii. 159 (1834), as to *P. ovalifolia*.
Pieris sect. *Eupieris* Bentham & Hooker, Gen. Pl. ii. 588 (1876).
Lyonia subgen. *Pieris* Drude in Engler & Prantl, Nat. Pflanzenfam. iv. abt. i. 44 (1889).

This section, the type of which is *Pieris ovalifolia* (Wall.) Don = *X. ovalifolia* Rehd., is characterized by the flowers borne in axillary and terminal on-sieded usually elongated racemes, by the less strongly thickened sutures and the usually appendaged filaments (without appendages in *X. villosa* Rehd.); the leaves are entire, persistent or deciduous and glabrous or more or less pubescent. The species of this section are all Asiatic and distributed from Kashmir through the Himalayas to western and eastern China, to central and southern Japan and to Formosa. The sectional names Pieris and Eupieris cannot be used, as they do not contain the type species of Pieris which is *P. formosa* Don and belongs to a distinct genus.

Andromeda glaucophylla f. latifolia, comb. nov.

Andromeda polifolia α. *latifolia* Aiton, Hort. Kew. ii. 68 (1789).—Pursh, Fl. Am. Sept. i. 291 (1814), as β. *latifolia*.—Loddiges, Bot. Cab. vi. t. 546 (1821).

This variety differs in its oblong or narrow-oblong less revolute leaves from the type which has linear or linear-oblong leaves. Link's description of his *A. glaucophylla* is apparently based on a plant cultivated in the Botanic Garden at Berlin and as he describes his species as with "foliis linearibus," the narrow-leaved form must be considered the type. The citation of Pursh's *A. polifolia* β. as a synonym does not necessarily indicate as Fernald assumes (in Rhodora, XVIII. 100 [1916]) that Link based his species on Pursh's variety, for in this case Link is describing a plant cultivated in the Berlin Botanic Garden and that plant of which possibly specimens are preserved in the Berlin herbarium is to be considered the type. Considering the specific name I fully agree with Professor Fernald that *A. glaucophylla* Link is the same plant as *A. canescens* Small which has to be referred as a synonym to it, and that it is not identical with *A. polifolia* as Small (in N. Am. Fl. XXIX. 61 [1914]) has it.

× **Erica Mackaii** Hook. var. **Watsonii**, comb. nov.

Erica ciliaris subsp. * *Watsoni* Bentham in De Candolle, Prodr. VII. 665 (1838).
Erica ciliaris β. *Watsoni* K. Koch, Hort. Dendr. 329 (1853).
Erica Tetralix β. *Watsoni* Babington, Man. Brit. Fl., ed. 4, 214 (1856).
Erica Tetralici-ciliaris Syme, Engl. Bot. VI. 39, t. 888 (1866).
Erica Watsoni Macfarlane in Trans. R. Soc. Edinb. XXXVIII. 237 (1895).—Chevalier in Monde Pl. VI. 53 (1896); VII. 193 (1897); in Bull. Herb. Boissier, VI. apx. IV. 10 (1898).—Neyrant in Act. Soc. Linn. Bordeaux, LV. Compt. Rend. 160 (1900).—Schneider, Ill. Handb. Laubholzk. II. 566 (1911).—Bean, Trees Shrubs Brit. Isles, I. 520 (1914).

As there can be hardly any doubt that *Erica Watsoni* and *E. Mackaii* are both hybrids between *E. ciliaris* L. and *E. Tetralix*, they should be united under the oldest binomial designation which is *E. Mackaii* Hook., and *E. Watsoni* which differs from typical *E. Mackaii* chiefly in its racemose inflorescence and the longer corolla with oblique mouth may be distinguished as a variety.

Vaccinium japonicum Miq. var. **sinicum**, comb. nov.

Oxycoccoides japonicus var. *sinica* Nakai, Trees Shrubs Jap. I. 168 (1922), descriptione in lingua japonica tantum.

A typo recedit foliis ovato-oblongis vel oblongo-lanceolatis basi late cuneatis vel rotundatis subtus basin versis ad et secus costam ut petiolus villosis interdum glabris vel fere glabris, filamentis supra medium pilosis.

CHINA. Kweichou: Tchuenning-shan, near Kweiyang, alt. 1100-1250 m., *H. Handel-Mazzetti*, no. 10522 (type) July 1, 1917. Szechuan: Wen chuan hsien, alt. 1500–2000 m., *E. H. Wilson*, no. 971, October, 1908; north Wushan, *A. Henry*, no. 643. Hupeh: Chang yang hsien, alt. 1300 m., *E. H. Wilson*, no. 244, October, 1907; without precise locality, *E. H. Wilson*, no. 1621, August, 1900, *A. Henry*, no. 6021.

The Chinese specimens enumerated above all differ in their smaller much narrower leaves never cordate or subcordate at the base, as they often are in the Japanese type in which, moreover, the petioles and the leaves are always quite glabrous. In its pilose filaments and its narrow leaves the variety resembles *V. japonicum* var. *lasiostemon* Hayata (Icon.

Pl. Formos. II. 115, t. 12 [1912]) from Formosa, but the leaves of the Formosan variety are quite glabrous according to the description. Dr. Nakai has proposed for *V. japonicum* Miq. and *V. erythrocarpum* Michx. the new genus Oxycoccoides (in Tokyo Bot. Mag. XXXI. 246 [1917]), but in doing so he overlooked the fact that Small in 1903 (in his Fl. S. E. U. S. 896, 1336) based the new genus Hugeria on *V. erythrocarpum* and as the two species are undoubtedly congeneric differing only in minor characters, the oldest name for this genus, if separated from Vaccinium or from Oxycoccus, will be Hugeria Small. The name Oxycoccoides proposed by Bentham & Hooker (Gen. Pl. II. 574 [1876]) as a section of Vaccinium though older than Hugeria, cannot invalidate a properly published generic name.

Viburnum molle f. leiophyllum, forma nova.

A typo recedit foliis subtus glabris axillis venarum barbatis exceptis vel interdum ad venas sparse pilosis.

MISSOURI: Stone County, Galena, high limestone bluffs, James River, *E. J. Palmer*, no. 5671, May 20, 1914 (type), no. 4671, October 15, 1913 and no. 17226, April 17, 1920, no. 22816, May 23, 1923, no. 23872*a*, September 24, 1923. Taney County, Swan, cliffs of the Swan River, *C. S. Sargent*, October 8, 1899, *B. F. Bush*, no. 798, October 9, 1899 (Gray Herb.), no. 3449, September 26, 1905. MacDonald County, Noel, *B. F. Bush*, nos. 5531, 5763, April 25, and May 27, 1909. Benton County, Cole Camp Creek, *Wm. Trelease*, no. 4, May 19, 1904.

CULTIVATED: Arnold Arboretum under no. 4643: August 29, 1913, June 9, 1910, February 15, June 27 and September 20, 1917, December 23, 1918, June 7, 1921.

This form differs only in the glabrous or nearly glabrous under side of the leaves from typical *V. molle* Michx. which has the leaves densely soft pubescent beneath.

An intermediate form represents a specimen of the co-type of *V. Demetrionis* Deane & Robins., a synonym of *V. molle*, from the Cole Camp Creek, Benton County, in the Herbarium of the Arnold Arboretum, the leaves of which are very sparingly pubescent with mostly forked hairs beneath, except the veins which are more densely pilose with mostly simple hairs; other specimens from the same locality have the leaves densely pubescent beneath as in the typical form, while Trelease's No. 4 cited above has nearly glabrous leaves. Of the type there are specimens from the following localities in the Arnold Arboretum Herbarium: Danville, Kentucky (type locality), Benton County (type locality of *V. Demetrionis* Deane & Robins.), Christian, Stone and Boone Counties, Missouri, and Carroll and Ripley Counties, Indiana. This shows that from two localities, Cole Camp Creek, Benton County and Galena, Stone County, Missouri, both forms are represented and that the glabrescent form seems to occur only in the western part of the range of the species.

The variety bears some resemblance to *V. affine* Bush, but that species may be distinguished by the light brown or grayish brown, not light gray or light grayish yellow, color of the branchlets, the close bark of older

branches, the smaller ovate or elliptic-ovate, not orbicular-ovate leaves rounded or only slightly cordate at base and by the shorter petioles only 0.6–1.2 cm. or rarely up to 1.5 cm. long.

Viburnum pubescens var. **Deamii**, var. nov.

A typo recedit foliis majoribus orbiculari-ovatis brevissime abrupte acuminatis interdum ovatis vel ovato-ellipticis, rarius obovatis eis turionum interdum ovato-oblongis supra accumbenti-pilosis subtus tota facie molliter laxeque in nervis densius et longius fasciculato-pilosis, nervis utrinque 9–11 praeditis, petiolis saepe stipulis subulatis instructis supra tantum densius pubescentibus subtus sparsius vel glabrescentibus, pedunculis ramulisque novellis glabris vel fere glabris.—Frutex 3 m. altus; folia basi truncata vel rotundata, rarius late cuneata, 5–9 cm. longa et 4.5–9 cm. lata vel angustiora tenuiter membranacea, dentibus latissime triangularibus utrinque 15–20, petiolis 1–2.5 cm. longis; pedunculus 5–9 cm. longus.

INDIANA: Brown County, deep wooded ravine about 2 miles southeast of Helmsburg, *C. C. Deam*, no. 11148, June 16, 1912 and no. 12217, August 25, 1912 (type). Jefferson County, in a Liquidambar woods 6 miles north of Madison, *C. C. Deam*, no. 18848, September 9, 1915. Spencer County, base of wooded slope 3 miles south of St. Meinard, *C. C. Deam*, no. 16541, June 28, 1915; Sweet Gum and Pin Oak woods 1½ miles northeast of lake, *C. C. Deam*, no. 37505, August 10, 1922, nos. 39951, 39952, October 2, 1923; on crest of a low ridge 1½ miles north of Helmsburg, *C. C. Deam*, no. 38950, July 4, 1923. Jackson County, top of slope about ¾ mile southwest of Chestnut Ridge, *C. C. Deam*, no. 38619, June 18, 1923. Jennings County, roadside, 2.7 to 3 miles south of San Jacinto, *C. C. Deam*, nos. 38595, 38598, no. 38878, June 16, 1923. Switzerland County, flat low woods about 1 mile southeast of Fairview, *C. C. Deam*, no. 40040, October 13, 1923.

The presence of stipules on many of the petioles of the variety suggests affinity to *V. affine* Bush and *V. molle* Michx., but both these species have a very different fruit with a much flattened stone showing two lateral grooves on the ventral side, while this variety agrees exactly in its fruit with the type of *V. pubescens* Pursh (*V. venosum* Britt.) which has a globose conical or short ellipsoidal scarcely or slightly compressed stone with a deep groove in the middle of the ventral side. In typical *V. pubescens* and in its varieties, var. *Canbyi* Blake and var. *longifolium* Blake, the petioles are almost always without stipules, but may be occasionally stipulate on any of these three varieties, therefore it does not seem advisable to consider the greater or lesser prevalence of stipules a character of sufficient value to separate this and the following variety specifically from *V. pubescens*. In the size and shape of its leaves, at least in its typical form, var. *Deamii* has some resemblance to *V. molle*, but in that species the leaves are distinctly cordate at base, the branchlets are light gray or light grayish yellow and the bark on older branches separates in thin flakes. It also resembles *V. pubescens* var. *Canbyi* Blake which, however, has somewhat smaller and narrower leaves with fewer veins and glabrescent beneath and pubescent branchlets, though occasionally the under side of the leaves may be more pubescent as in a specimen from Waynesville, N. C. (Bilt-

more Herb. without no. and collector, July 27, 1903). In the pubescent underside of its leaves var. *Deamii* resembles var. *longifolium* Blake but that variety has much smaller and narrower, ovate ot ovate-oblong leaves with more numerous veins and longer teeth. From the southern *V. scabrellum* Chapm. which agrees with *V. pubescens* in the fruit and stone, var. *Deamii* is easily distinguished by the glabrous smooth branchlets. The leaves of some specimens resemble those of the following variety in shape and serration but they all have the under surface soft pubescent.

Viburnum pubescens var. **indianense,** var. nov.

Affinis var. *Canbyi* Blake sed differt ramulis novellis glabris, foliis grossius serratis dentibus fere ac longis quam latis, petiolis plerisque stipulis subulatis instructis et supra leviter vel interdum densius adpresse pilosis rarius glabrescentibus.—Folia orbiculari-ovata vel ovata, 6–9 cm. longa et 4.5–7.5 lata.

INDIANA: Clay County, ravine 3 miles north of Brazil, *C. C. Deam*, no. 38986, July 7, 1923, no. 39002, July 7 and September 19, 1923. Putnam County, 4 miles south of Russelville on wooded hillside along Racoon Creek, *E. J. Grimes*, no. 582, June 14, 1911. Lawrence County, White and Black Oak woods ¼ mile north of Mitchell, *C. C. Deam*, no. 18517, September 2, 1915 (type). Ripley County, border of a dense Beech and Sweet Gum woods 7 miles southeast of Versailles, *C. C. Deam*, nos. 16119, June 18, 1915, and 8 miles south of Versailles, no. 18838, September 9, 1915; clearing 1 mile north of Osgood, *C. C. Deam*, no. 38874, June 15, 1923. Clark County, on a bank of a creek about 2 miles northeast of Borden, *C. C. Deam*, no. 40022, October 11, 1923. Spencer County, low flat woods 2½ miles northwest of Rockport, *C. C. Deam*, no. 39971, October 4, 1923.

This variety differs from var. *Canbyi* chiefly in the presence of stipules on most of the petioles, by which character it agrees with the preceding variety; it also differs in the generally coarser serration of the leaves and the glabrous young branchlets, though occasional specimens of the latter variety show the same kind of serration and may have glabrous or glabrate branchlets. Some specimens as nos. 39002, 39971 and 40022 with smaller glabrescent leaves approach *V. dentatum* L. but may be distinguished by the presence of stipules, larger inflorescence and larger short-ellipsoidal fruit from that species which apparently never has stipules and has smaller subglobose fruit and denser smaller inflorescence.

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RAPHIOLEPIDIS ET ERIOBOTRYAE SPECIES SINO-JAPONICAE

T. NAKAI

Raphiolepis Lindley in Bot. Reg. VI. 468 (1820); Collect. 3 (1821).

Folia magis impresso-reticulata.
  Folia 10–15 cm. longa, 3–3.5 cm. lata, grosse serrata. Panicula 12 cm. longa. *R. major.*
  Folia vix 8 cm. longa, non grosse serrata. Panicula brevis, circiter 2–3 cm. longa. *R. rugosa.*
Folia plana vel venis impressis sed non distincte rugosa.
  Rami robusti. Poma vulgo circiter 10 mm. lata.
    Frutex regionum calidiarum incola, ramis erectis vel ascendentibus. Folia oblonga vel obovato-oblonga, integerrima vel crenata....*R. integerrima.*
    Frutex regionum temperatarum incola, ramis divaricatis. Folia late obovata vel obovata vel fere rotundata.
      Folia obovata vel oblongo-obovata, plus minus crenato-dentata. *R. umbellata.*
      Folia obovata vel late obovata vel fere rotundata, integra vel crenato-dentata.....*R. umbellata* f. *ovata.*
  Rami graciles. Poma vix 8 mm. lata.
    Frutex ramis erectis vel ascendentibus, fastigiatus vel fusiformis. Folia oblanceolata plus minusve elongata.....*R. liukiuensis.*
    Frutex plus divaricatus. Rami graciliores.
      Folia salicaria. Petala lanceolata.....*R. salicifolia.*
      Folia non salicaria, latiora.
        Rami gracillimi. Folia parva, oblanceolato-oblonga, supra venis impressis. Inflorescentia multiflora. Poma vix 5 mm. lata...*R. gracilis.*
        Rami gracilis. Folia varia. Poma 5–8 mm. lata.
          Folia vulgo in apice rami conferta.
            Bracteae spirales.....*R. indica* var. *spiralis.*
            Bracteae non spirales.
              Inflorescentia racemosa vel subracemosa.
                Petala obovata; stamina brevia.....*R. indica* var. *typica.*
                Petala lanceolata; stamina elongata..*R. indica* var. *phaeostemon.*
              Inflorescentia corymbosa.
                Petala lanceolata.....*R. indica* var. *crataegoides.*
                Petala obovata vel ovata.....*R. indica* var. *Tashiroi.*
          Folia vulgo sparsa.
            Petala lanceolata. Folia latiora.
              Inflorescentia bracteata.....*R. rubra* var. *typica.*
              Inflorescentia foliosa.....*R. rubra* var. *foliosa.*
            Petala ovata vel obovata.
              Folia lanceolata.....*R. rubra* var. *lanceolata.*
              Folia latiora.....*R. rubra* var. *minor.*

Raphiolepis major Cardot in Lecomte, Not. Syst. III. 380 (1918).
Raphiolepis indica var. *grandifolia* Franchet in Bull. Soc. Bot. France, XLVI. 207 (1899).
CHINA: Prov. Fokien, monte Kuantun.

Raphiolepis rugosa Nakai, sp. nov.

Frutex 0.5–1 m. altus (fide lectoris). Rami annotini glabrescentes. Folia in apice rami conferta, juvenilia rufo-pilosa, glabrescentia; petioli 2–3 mm. longi; lamina oblonga utrinque attenuata, glaberrima, supra venis impressis rugosa, infra pallida venis elevatis, margine subargute serrata, 3–6 cm. longa, 1.7–2.7 cm. lata. Racemus brevissimus, ferrugineo-tomentosus, pauciflorus; bracteae et bracteolae deciduae; flores bibracteolati; calycis tubus lobique ferrugineo-tomentosus, 5 mm. longus, apice subito amplicatus, lobi ovato-acuminati, apice glabri, 4 mm. longi; petala alba, obovata, apice carinata mucronata reflexa, margine denticulata, infra medium integra fimbriato-barbata, 7 mm. longa; stamina purpurea, corollae fere aequilonga, antherae rotundatae albae; styli 2 staminibus infimis brevissimis paulo breviores, glaberrimi.

CHINA: prov. Kiangsi, Woo Kung Shan, *H. H. Hu*, no. 711.

Raphiolepis integerrima Hooker & Arnott, Bot. Beechey Voy. 263 (1837–1840).—Walpers, Repert. II. 57 (1843).—Roemer, Syn. Monog. III. 114 (1847).
Raphiolepis Mertensii Siebold & Zuccarini, Fl. Jap. I. 164 in nota (1841); in Abh. Akad. Muench. IV. 2, 130 (Flor. Jap. Fam. Nat. I. 22)(1845).—Walpers, Rep. II. 57 (1843).—Roemer, Syn. Monog. III. 114 (1847).
Raphiolepis japonica var. *integerrima* Maximowicz in Bull. Acad. Sci. St. Pétersb. XIX. 181 (1877), pro parte; in Mél. Biol. IX. 181 (1870), pro parte.—Yatabe, Icon. Fl. Jap. II. pt. 2, 89 (1892), pro parte.—Non Hooker f.
Raphiolepis japonica A. Gray in Mem. Am. Acad. n. ser. VI. 387 (1859), pro parte.—Non Siebold & Zuccarini.
Raphiolepis umbellata var. *Mertensii* Makino in Tokyo Bot. Mag. XVI. 14 (1902), pro parte.—Koidzumi in Jour. Coll. Sci. Tokyo XXXIV. art. 2, 72. (Consp. Rosac. Jap.) (1913), pro parte.—Matsumura, Ind. Pl. Jap. II. pt. 2, 223 (1912), pro parte.
Opa integerrima Seemann in Jour. Bot. I. 281 (1863).
Opa Mertensii Seemann, l. c.
BONIN: insula Chichijima, *H. Otomo, E. H. Wilson*, no. 8220, *Gonzales*.
FORMOSA: Botel Tobago, *S. Sasaki*.

This is a tree with ascending or upright branches though it becomes low and shrubby on wind-swept rocks. Unlike *Raphiolepis umbellata* it is not hardy in Tokyo and is easily distinguished from it by the mode of branching and by its leaves. The wood is hard and durable. The discovery of this species in Botel Tobago is interesting.

Raphiolepis umbellata Makino in Tokyo Bot. Mag. XVI. 13 (1902).—Schneider, Ill. Handb. Laubholzk. I. 705, fig. 390 h–i, fig. 391 i (1906).—Fedde, Rep. Sp. Nov. III. 152 (1907).—Matsumura, Ind. Pl. Jap. II.

pt. 2, 222 (1912), pro parte.—Koidzumi in Jour. Coll. Sci. Tokyo, xxxiv. art. 2, 71 (Consp. Rosac. Jap.) (1913), pro parte.

Laurus umbellata Thunberg, Fl. Jap. 175 (1784).

Mespilus Sieboldii Blume, Bijidr. 1122 (1826).

Photinia Sieboldii G. Don, Gen. Syst. II. 602 (1832).

Raphiolepis japonica Siebold & Zuccarini, Fl. Jap. I. 162, t. 75 (1841); in Abh. Akad. Muench. IV. 2, 130 (Fl. Jap. Fam. Nat. I. 22) (1845).—Roemer, Syn. Monog. III. 114 (1847).—K. Koch in Ann. Mus. Lugd.-Bat. I. 250 (1863).—Miquel in Ann. Mus. Lugd.-Bat. III. 41 (Prol. Fl. Jap. 229) (1867).—Wenzig in Linnaea, xxxviii. 104 (1874).—Decaisne in Nouv. Arch. Mus. Paris, x. 133 (1874), pro parte.—Engler & Maximowicz in Bot. Jahrb. VI. 63 (1885).—Yatabe, Icon. Fl. Jap. I. pt. 2, 89 t. 25 (1892), pro parte.

Opa japonica Seemann in Jour. Bot. I. 281 (1863).

Raphiolepis Sieboldii Hasskarl in Hoeven & De Vries, Tijdschr. x. 196 (1843).

Banks, Icon. Kaempfer, t. 56 (1791), sine nomine.

KYUSHU: prov. Osumi, mt. Kirishima, *Z. Tashiro;* insl. Tanegashima, *E. H. Wilson.*

The branches of this species are more robust and more spreading than those of *Raphiolepis integerrima*, and the leaves are thicker and broader. This is hardy in Tokyo and is an important plant in Japanese landscape gardening.

Raphiolepis umbellata f. **ovata** Schneider, Ill. Handb. Laubholzk. III. 706. fig. 291. k (1906).—Fedde, Rep. Sp. Nov. III. 152 (1907).

Raphiolepis japonica var. *integerrima* Hooker f. in Bot. Mag. xci. t. 5510 (1865), excl. syn.—Maximowicz in Bull. Acad. Sci. St. Pétersb. xix. 181 (1873), pro parte; in Mél. Biol. IX. 181 (1873), pro parte.

Raphiolepis ovata Briot in Rev. Hort. 1870, 348. fig. 52.

Raphiolepis umbellata var. *Mertensii* Makino in Tokyo Bot. Mag. XIV. 14 (1902), pro parte.—Matsumura, Ind. Pl. Jap. II. pt. 2, 222 (1912), pro parte.—Koidzumi in Jour. Coll. Sci. Tokyo xxxiv. art. 2, 72 (Consp. Rosac. Jap.) (1913), pro parte.

Raphiolepis japonica A. Gray in Perry Narr. Exp. China Jap. 311 (1856); in Mem. Am. Acad. n. ser. VI. 387 (1859), pro parte.—Non Siebold & Zuccarini.

Raphiolepis Mertensii var. *ovata* Nakai in Tokyo Bot. Mag. xxx. 22 (1916); Fl. Sylv. Kor. VI. 22, pl. 9 (1916).

Folia latiora quam in forma typica, integerrima vel rarius indistincte serrata.

HONDO: prov. Idzu, Shimoda, *Williams & Morrow;* ibidem, *C. Wright;* insula Hachijyo, *E. H. Wilson*, no. 8390; prov. Sagami, Kamakura, *E. H. Wilson*, no. 6625.

KYUSHU: prov. Osumi, insl. Tanegashima, *H. Sakurai.*

QUELPAERT: in littorale, *E. Taquet*, no. 5541.

KOREA: prov. Keisho austr., insl. Zetsueito, *T. Uchiyama.*

Raphiolepis liukiuensis Nakai, sp. nov.

Raphiolepis umbellata var. *liukiuensis* Koidzumi in Jour. Coll. Sci. Tokyo, xxxiv. art. 2, 73 (Consp. Rosac. Jap.) (1913).—Nakai in Tokyo Bot. Mag. xxx. 21 (1916); Fl. Sylv. Kor. VI. 31, pl. 8 (1916).

Raphiolepis japonica Maximowicz in Bull. Acad. Sci. St. Pétersb. xix. 183 (1873), pro parte; in Mél. Biol. IX. 181 (1873), pro parte.—Decaisne in Nouv. Arch. Mus. Paris, x. 133. (1874), pro parte—Engler & Maximowicz

in Bot. Jahrb. VI. 63 (1885), pro parte.—Ito et Matsumura in Jour. Coll. Sci. Tokyo, XII. 191 (Tent. Fl. Lutch.) (1899).—Non Siebold & Zuccarini.
Raphiolepis umbellata Nakai in Tokyo Bot. Mag. XXVI. 95 (1912); Report Veget. Isl. Quelpaert, 53 (1914); Report Veget. Isl. Wangto, 8 (1914); Chosenshokubutsu I. 290, f. 343, a. (1914).—Non Makino.

Frutex vel arbor usque 10 m. altus erectus, sed in rupibus ubi ventis perpetuis expositus nanus, ramosissimus. Rami rubro-purpurascentes glaberrimi, vetusti cinerei. Folia distincte petiolata; petioli rubescentes, 2–20 mm. longi in parte superiore saepe decurrenti-alati; lamina linearioblonga vel oblanceolata, 4–11 cm. longa et 1–4.7 mm. lata, margine leviter crenato-serrata, apice obtusa vel acuta vel subacuminata, supra glabra lucida, infra pallida opaca costis prominentibus sed venis in viva obscuris; folia juvenilia pilis fuscescentibus caducissimis obtecta, aestivatione convoluta. Inflorescentia in apice rami annotini terminalis corymboso-racemosa primo pilis fuscescentibus caducis obtecta sed mox glabrescens; bracteae bracteolaeque lanceolatae 3–7 mm. longae, acuminatae, caducae; calycis tubus glaber vel rufo-pilosus, lobi lanceolati vel linearilanceolati vel latiores, intus pilosi, 3–5 mm. longi, apice acutissimi vel aristati, petala alba, oblonga vel subrotundata, acuminata vel obtusa, 8–10 mm. longa; stamina calycis lobis longiora vel breviora, antherae atro-purpureae; styli 2, stamina superantes. Fructus globosus vel ovoideus, apice cicatrice calycis umbilicatus, 8 mm. longus, niger.

QUELPAERT: in rupibus littoris, *U. Faurie*, Nos. 1562 (type), 1563, 552; in rupibus Hioton, *E. Taquet*, no. 2808; in parva insula Tyi-gito, *E. Taquet*, no. 2807; in rupibus littoris Syekeui, *E. Taquet*, no. 743; in rupibus insulae Saiseum, *E. Taquet*, no. 742.

KOREA: Mokpo, *H. Ueki*.

FORMOSA: Hiiranzan, *R. Kanehira*, no. 21.

LIUKIU: Okinawa Isl., in silvis circa Nago, *E. H. Wilson*, no. 8173.

KYUSHU: Isl. Sakurajima, *U. Faurie*, no. 3848.

I have collected this species also on the island of Wangto, on the islands Chinto, Chito and Hokitsuto, in Quelpaert and Kainan peninsula of Korea. Two sterile specimens from Liukiu, communicated by the Yokohama Nursery Co., are in the herbarium of the Arnold Arboretum. They have linear-lanceolate leaves tapering at both ends, and may represent a distinct variety.

Raphiolepis salicifolia Lindley, Collect., in nota sub tab. 3 (1821).—Ker in Bot. Reg. VIII. t. 652 (1822).—De Candolle, Prodr. II. 630 (1825).—G. Don, Gen. Syst. III. 602 (1832).—Spach, Hist. Vég. II. 79 (1834).—Roemer, Syn. Monog. III. 114 (1847).—Decaisne in Nouv. Arch. Mus. Paris, X. 133 (1874).—Wenzig in Linnaea, XXXVIII, 103 (1874).
Raphiolepis indica Lindley var. *angustifolia* Cardot in Lecomte, Not. Syst. III. 380 (1918).

CHINA ET ANNAM.

Raphiolepis gracilis Nakai, sp. nov.

Frutex 2–3-metralis, ramosissimus (fide lectoris). Rami graciles, glaber-

rimi. Petioli 3–5 mm. longi, apice alati et sensim in laminam transientes; lamina oblonga vel lanceolata, 15–43 mm. longa et 5–17 mm. lata, glaberrima, supra leviter convexa, venis et costis impressis, infra leviter concava, venis costisque elevata, margine crenato-serrata. Flores ignoti. Infructescentia paniculata, ambitu ovata, 25–50 mm. longa, glaberrima; poma globosa, vix 5 mm. lata, apice umbilicata.

China: prov. Chekiang, S. Yentang, *H. H. Hu*, Nos. 228, 220.

The collector states that this species grows in the open places and is very common in the locality cited. This seems to be an entirely glabrous plant, for the specimens collected in August bear still unfolding young leaves at the end of branches which are quite glabrous.

Raphiolepis indica Lindley apud Ker in Bot. Reg. vi. 465 (1820), descript. & tab. excl.—De Candolle, Prodr. ii. 630 (1825).—G. Don, Gen. Syst. ii. 601 (1832).—Spach, Hist. Vég. ii. 79 (1834).—Maximowicz in Bull. Acad. Sci. St. Pétersb. xix. 180 (1873), excl. syn. *R. salicifolia;* in Mél. Biol. ix. 181 (1873), excl. syn. *R. salicifolia.*—Wenzig in Linnaea, xxxviii. 101 (1874).—Decaisne in Nouv. Arch. Mus. Paris, x. 132 (1874).—Dunn et Tutcher in Kew Bull. Misc. Inform. add. ser. x. 97 (Fl. Kwangtung & Hongkong) (1912).

Crataegus indica Linnaeus, Spec. 477 (1753).—Willdenow, Spec. ii. 1005 (1779).—Loureiro, Fl. Cochinch. 319 (1790).—Sims in Bot. Mag. xli, t. 1726 (1815).—Schrank, Pl. Rar. Hort. Acad. Monac. ii. t. 60 (1819).

Opa Metrosideros Loureiro, Fl. Cochinch. 309 (1790), excl. syn.—Seemann in Jour. Bot. i. 280 (1863).

Raphiolepis indica is not a native of India but is widely distributed in China and Cochinchina where there are many varieties and forms. Owing to its polygamy the stamens are longer or shorter than the calyx-lobes or equal to them in length. The petals are roundish or acute at the apex. The serration and broadness of the leaves are individually different.

Raphiolepis indica var. **typica** Nakai.

Inflorescentia racemosa vel subracemosa; petala obovata; stamina brevia.

China.

Raphiolepis indica var. **spiralis** Nakai, var. nov.

Raphiolepis spiralis G. Don, Gen. Syst. ii. 602 (1832).—Walpers, Rep. ii. 57 (1843).—Roemer, Syn. Monog. iii. 113 (1847).

Mespilus spiralis Blume, Bijidr. 1102 (1826).

Crataegus spiralis Steudel. Nomencl. ed. 2. i. 434 (1841).

Opa spiralis Seemann in Jour. Bot. i. 281 (1863).

Folia cuneato-oblonga, serrata. Flores racemosi; bracteae spirales.

China.

Raphiolepis indica var. **phaeostemon** Nakai.

Raphiolepis indica Ker in Bot. Reg. vi. 465 (1820), excl. syn. *Crataegus indica.*—Sprengel, Syst. Veg. ii. 508 (1825). Non Lindley.

Raphiolepis phaeostemon Lindley, Collect., in nota sub tab. 3 (1821).—De

Candolle, Prodr. II. 630 (1825).—G. Don, Gen. Syst. II. 601 (1832).—Spach, Hist. Vég. II. 79 (1834).

Raphiolepis pheostemonia Saint-Lager in Ann. Soc. Bot. Lyon, VII. 133 (1880).

Folia lanceolata v. ovato-lanceolata serrata. Inflorescentia fere racemosa. Petala lanceolata. Stamina elongata.

CHINA.

Raphiolepis indica var. **crataegoides** Nakai, var. nov.

Raphiolepis crataegoides Roemer, Syn. Monog. III. 113 (1847), excl. syn.

Inflorescentia corymbosa; petala lanceolata.

CHINA.

Roemer referred Linné's *Crataegus indica* here, but there is no testimony that this plant had lanceolate petals. Linnaeus says "Corymbis squamosis" but nothing about the shape of petals. Loureiro says "Petala 5, subrotunda." Roemer's conception may have been induced from the remarks of Ker under *Raphiolepis salicifolia* in Botanical Register, tab. 652. Lindley thought that Linnaeus's *Crataegus indica* was the same as Loureiro's plant which has roundish petals. This may or may not be so but the shape of the petals is not a specific character, and both Ker's and Lindley's plant belong to *Raphiolepis indica* or *Crataegus indica*.

Raphiolepis indica var. **Tashiroi** Hayata in Jour. Coll. Sci. Tokyo, XXII. 129, (Enum. Pl. Formos.) (1906).

Crataegus indica Loureiro Fl. Cochinch. 319 (1790).

Raphiolepis sinensis Roemer, Syn. Monog. III. 104 (1847).

Raphiolepis indica Hayata, Icon. Pl. Formos. I. 248 (1911).—Koidzumi in Tokyo Bot. Mag. XXIII. 171 (1919); in Jour. Coll. Sci. Tokyo, XXXIV. art. 2, 71 (Consp. Rosac. Jap.) (1913).

Raphiolepis umbellata Matsumura, Ind. Pl. Jap. II. pt. 2, 222 (1912), pro parte.—Koidzumi in Jour. Coll. Sci. Tokyo, XXXIV. art. 2, 71 (1913), pro parte.—Non Makino.

Folia cuneiformi-ovata. Petala ovata vel obovata.

CHINA ET FORMOSA.

Raphiolepis rubra Lindley, Collect. tab. 3 (1821).—De Candolle, Prodr. II. 630 (1825).—G. Don, Gen. Syst. II. 601 (1832).—Lindley in Bot. Reg. XVII. t. 1407 (1831).—Roemer, Syn. Monog. III. 114 (1847).

Crataegus rubra Loureiro, Fl. Cochinch. 319 (1790).

Mespilus sinensis Poiret, Encycl. Méth. Suppl. IV. 70 (1816).

Folia secus ramos plus minus sparsim disposita.

Raphiolepis rubra var. **typica** Nakai.

Folia ovata vel elliptica. Stamina calycis lobis breviora vel eos superantia; petala lanceolata.

CHINA AUSTR. ET COCHINCHINA.

Raphiolepis rubra var. **foliosa** Nakai, var. nov.

Crataegus sinensis Loiseleur-Deslongchamps, Herb. Gén. Amat. IV. 247, t. (1820).

Inflorescentia foliosa. Cetera ut antea.

CHINA.

Raphiolepis rubra var. **lanceolata** Nakai, var. nov.

Raphiolepis Loureiri Sprengel, Syst. Veg. II. 508 (1825), excl. syn.—Roemer Syn. Monog. III. 114 (1847), excl. syn.

Folia lanceolata. Petala ovata vel subrotundata.

Sprengel considered this to be the *Crataegus indica* of Loureiro and wrote that this species had lanceolate leaves and Roemer followed him, but Loureiro's description—"Folia cuneiformi-ovalia—apice ovata basi attenuata"—shows that this (his) type is different and belongs to *Raphiolepis indica*.

China?

Raphiolepis rubra var. **minor** Nakai, comb. nov.

Raphiolepis umbellata var. *minor* Makino in Tokyo Bot. Mag. XVI. 14 (1902).
Raphiolepis minor Koidzumi in Tokyo Bot. Mag. XXIII. 171 (1907); in Jour. Coll. Sci. Tokyo, XXXIV. art. 2, 73 (Consp. Rosac. Jap.) (1913).

Inflorescentia contracta; petala obtusa.

This is known only in Japanese gardens, especially in temple grounds near Kyoto. I suspect that it was brought from China as *Gingko biloba*, *Magnolia denudata*, *Magnolia liliiflora*, *Forsythia suspensa* and other plants have been, but the history is unknown. It is strange that this form only was introduced into Japan when there are so many varieties of both *Raphiolepis indica* and *R. rubra* in China.

Plantae mihi ignotae:

1. *Raphiolepis indica* var. *latifolia* Cardot in Lecomte, Not. Syst. III. 380 (1818).

2. *Raphiolepis indica* var. *mekongensis* Cardot l. c.

Berthold Seemann adopted Opa as the generic name of Raphiolepis for reason of its priority. Opa includes two species: *Opa odorata* Loureiro which is *Eugenia Millettiana* Hemsley and *Opa Metrosideros* Loureiro which is *Raphiolepis indica*. The type specimens are said to be in the British Museum. From the generic description of Opa "calyx lacinis rotundatis, petala subrotunda, filamenta corolla duplo longiora," we can readily understand that it was based on both plants. Now *Opa odorata* is the first species, so we must take it for the type of the genus. The generic name *Opa* is thus a synonym of Eugenia (or Szygium in a restricted sense) partly and that of Raphiolepis partly.

Eriobotrya Lindley in Trans. Linn. Soc. XII. 102 (1822).

Folia adulta subtus pilosa vel tomentosa, juvenilia pilis longioribus tomentosa. Inflorescentia calyce excepto glabra, ampla. Flores distincte pedicellati, ita inflorescentia laxiflora. Folia oblanceolata cum petiolis 10–22 cm. longa adulta subtus tantum pilis fuscescentibus pilosella. Fructus rubri..*E. Brackloi*.
Inflorescentia tomentosa, ampla. Flores sessiles vel subsessiles, ita inflorescentia densiflora. Fructus flavi.
Folia vulgo lanceolata vel oblanceolata, adulta infra tomentosa. Calyx 6–8 mm. longus. Fructus 2–5 cm. longi.....*E. japonica*.
Folia vulgo oblonga vel elliptica, adulta infra subglabrescentia. Calyx circiter 5 mm. longus. Fructus vix 1 cm. longus.
Folia obovata. Petala obovata integra; styli 3.....*E. obovata*.
Folia oblonga vel elliptica. Petala emarginata bifida; styli 2...*E. prinoides*.

Folia adulta subtus glaberrima, juvenilia saepe rufo- vel rufescenti-lanata.
Folia maxima vix 10 cm. longa.
Inflorescentia laxa quam 5 cm. longior.
Folia initio rubiginoso-tomentosa, oblanceolata, obtuse acuminata. *E. luzoniensis.*
Folia ab initio glaberrima obtusa vel oblongo-lanceolata, minute crenata. *E. oblongifolia.*
Inflorescentia contracta vix 5 cm. longa.
Folia obovato-oblonga, obtusata vel obtuse acuminata, cum petiolo 3–6 cm. longa et 1.2–2 cm. lata. ..... *E. pseudo-Raphiolepis.*
Folia lineari-oblonga vel oblanceolata vel lanceolata, acuminata vel attenuata, cum petiolo 3–9 cm. longa et 1–2.5 cm. lata..... *E. Henryi.*
Folia vulgo quam 10 cm. longiora.
Flores omnes sessiles ita in apice ramorum inflorescentia glomerata. Fructus sessiles. Folia late oblanceolata vel oblongo-obovata.
Folia 4–11 cm. lata..... *E. bengalensis.*
Folia 2.5–3.5 cm. lata..... *E. bengalensis* var. *angustifolia.*
Flores partim distincte pedicellati. Fructus stipitati.
Flores parvi, calyce 3–6 mm. longo. Folia juvenilia rufa.
Inflorescentia contracta 3–4 cm. longa, fuscescenti-pilosa vel glabrescens; calyx circiter 6 mm. longus. Folia lineari-oblonga vel obovata vel lanceolata, crenato-serrata vel subintegra..... *E. buisanensis.*
Inflorescentia quam 5 cm. longior, rufa. Folia oblanceolata.
Panicula elongata, 15 cm. longa. Folia oblongo-obovata. *E. tengyuehensis.*
Panicula quam 10 cm. brevior. Folia oblanceolata.
Folia fere integra rarius apice dentata. Calyx 3–4 mm. longus. *E. philippinensis.*
Folia grosse crenato-serrata. Calyx 5–6 mm. longus. *E. acuminatissima.*
Flores magni, calyce 7–9 mm. longo.
Folia apice indistincte serrata. Inflorescentia rufa..... *E. fragrans.*
Folia toto vel fere tota serrata. Inflorescentia rufescenti-lanata.
Inflorescentia calyce excepto glabra..... *E. Brackloi* var. *atrichophylla.*
Inflorescentia rufescenti-lanata.
Folia tota grosse serrata..... *E. deflexa.*
Folia fere tota crenato-serrata ..... *E. deflexa* var. *grandiflora.*

Eriobotrya Brackloi Handel-Mazzetti in Anzeiger Akad. Wiss. Wien, No. XII. (Pl. Nov. Sin. Fortsetz. 16, p. 2) (1922).

CHINA: prov. Kwantung; jugo Tsatmukngao prope oppidum Lienping ad bor.-orient. urbis Kwangtung, 800 m., *Rud. Mell*, No. 659.

Eriobotrya Brackloi var. **atrichophylla** Handel-Mazzetti, l. c.

CHINA: prov. Hunan austr.-occid.; in monte Yun-schan prope urbem Wukang, in silva elata frondosa umbrosa, 1300 m., *H. Handel-Mazzetti*, Nos. 12032, 12060.

Eriobotrya prinoides Rehder & Wilson in Sargent, Pl. Wilson. I. 194 (1912).—Schneider, Ill. Handb. Laubholzk. II. 999 (1912).

Eriobotrya bengalensis Dunn in Jour. Linn. Soc. XXXIX. 446 (1911).—Non Hooker f.

CHINA: prov. Yunnan, *A. Henry*, no. 9878; silvis Tsin siang cheou prope Peyentsin, *Simeon Ten*, no. 13; inter Siao makai et Schinlung, Yunnan fu, septent. versus, *C. Schneider*, no. 4047; prov. Szechuan, Tung Valley, *E. H. Wilson*, no. 3507.

Eriobotrya japonica Lindley in Trans. Linn. Soc. XIII. 102 (1822).—De Candolle, Prodr. II. 631 (1825).—Blume, Bijidr. 1103 (1826).—G. Don, Gen. Syst. II. 602 (1832).—Spach, Hist. Vég. II. 81 (1834).—Wight, Icon. Pl. Ind. Or. I. t. 222 (1840).—Siebold & Zuccarini, Fl. Jap. I. 182, t. 97 (1841); in Abh. Akad. Muench. IV. 2, 131 (Fl. Jap. Fam. Nat. I. 23) (1846).—Roemer, Syn. Monog. III. 147 (1847).—K. Koch in Ann. Mus. Lugd.-Bat. I. 250 (1863).—Miquel in Ann. Mus. Lugd.-Bat. III. 41, 208; Prol. Fl. Jap. 229, 372 (1867).—Maximowicz in Bull. Acad. Sci. St. Pétersb. XIX. 177 (1873); in Mél. Biol. IX. 175 (1873).—Wenzig in Linnaea, XXXVIII, 98 (1874).—Decaisne in Nouv. Arch. Mus. Paris, X. 145 (1874).—Hemsley in Jour. Linn. Soc. XXIII. 261 (1886).—Pritzel in Bot. Jahrb. XXIX. 388 (Fl. Centr. Chin.) (1900).—Matsumura & Hayata in Jour. Coll. Sci. Tokyo, XXII. 129 (Enum. Pl. Formos.) (1906).—Brandis, Ind. Trees, II. 290 (1906).—Schneider, Ill. Handb. Laubholzk. I. 711, fig. 386 a, 394 a–b (1906).—Hayata, Icon. Pl. Formos. I. 248 (1911).—Rehder & Wilson in Sargent, Pl. Wilson. I. 193 (1912).—Rehder in Bailey, Stand. Cycl. Hort. II. 1134 (1914).—Bean, Trees & Shrubs Brit. Isles, I. 525 (1914).—Nakai in Tokyo Bot. Mag. XXX. 18 (1916).

Pipa Boym, Fl. Sin. J, fig. [8] (1656).

Mespilus japonica Thunberg, Fl. Jap. 206 (1784)—Vitman, Summa Pl. III. 230 (1789)—Banks, Icon. Kaempfer, t. 19 (1791).—Willdenow, Spec. II. pt. 2, 1010 (1799).—Ventenat, Jard. Malmaison Pl. 19 (1803).—Jacquin, Fragm. Bot. 85, t. 136, f. 2. (1809).—Poiret in Nouv. Duhamel, ed. 2, IV. 147, t. 39 (1809).—Ker in Bot. Reg. V. t. 365 (1819).—Loiseleur-Deslongchamps, Herb. Gén. Amat. IV. 229, t. (1820).—Bagot in Trans. Hort. Soc. III. 299, t. 40 (1820); in Allg. Teutsch. Gart.-Mag. VII. 238, t. 16 (1823).—Sprengel, Syst. Veg. II. 505 (1825).—Geel, Sert. Bot. III. t. (1831).

Crataegus Bibas Loureiro, Fl. Cochinch. 391 (1793).

CHINA: Hupeh, Ichang, *E. H. Wilson*, no. 3000, ibidem, *A. Henry*, no. 5343, Hunan; prope urbem Tschangsha culta, *H. Handel-Mazzetti*, no. 471. Kwangtung, Liu Dist., *C. O. Levine*, no. 3317; prope Canton, *C. O. Levine*, no. 1932. Szechuan, inter Te chang et Huanglien po, *C. Schneider*, no. 810. Kweichou, prope urbem Kutschou in silvis, *H. Handel-Mazzetti*, no. 10892.

This is widely cultivated throughout the warmer regions of both China and Japan. It is a common wild plant on cliffs round Ichang and elsewhere in central China; also it is wild in Japan on cliffs and mountains, especially where lime-stone prevails as in prov. Bungo, prov. Nagato, prov. Tosa.

Eriobotrya obovata W. W. Smith in Notes Bot. Gard. Edinb. X. 29 (1917).

CHINA: Yunnan, circa Yunnan fu, *E. E. Maire*, no. 2450.

Eriobotrya luzoniensis Nakai, comb. nov.

Photinia luzoniensis Merrill in Philipp. Bur. Governm. Labor. Bull. XVII. 18 (1904); in Philipp. Jour. Sci. I. 60 (1906); II. 276 (1907).

PHILIPPINES: Isl. Luzon, mt. Mariveles, prov. Bataan, *T. E. Borden*, no. 269.

Eriobotrya oblongifolia Merrill & Rolfe in Philipp. Jour. Sci. III. 102 (1908).

PHILIPPINES: Isl. Mindanao, mt. Malindang, prov. Misamis, *Mearns & Hutchinson*, No. 4680.

Eriobotrya pseudo-Raphiolepis Cardot in Lecomte, Not. Syst. III. 371 (1918).

CHINA: Kweichou; prope Ou-k-gay et Hoang-ko-chou, *Seguin & Bodinier*, nos. 2262, 2617.

Eriobotrya Henryi Nakai, sp. nov.

Frutex vel arbor 1–7-metralis (fide Henry); rami adulti cinerei, glabrescentes, juveniles tomentosi. Folia juvenilia rufo-tomentosa, glabrescentia; petioli 5–11 mm. longi, subglabrescentes sed saepe pilis emortuis atratis obtecti; lamina lineari-oblonga vel oblanceolata vel lanceolata, 3–8.3 cm. longa et 7–27 mm. lata, serrata, utrinque acuminata vel attenuata, supra lucida. Inflorescentia rubiginoso-tomentosa, dense corymboso-racemosa, 2.5–4.5 cm. longa; bracteae et bracteolae fuscae, deciduae; flores brevipedicellati; calyx oblongus vel obovoideus, rubiginoso-tomentosus, tubo 2–3 mm. longo, lobis lanceolatis 2.5 mm. longis dorso glabro excepto rubiginoso-tomentosis; petala alba, obovata, obtusa vel acuta, integra vel dentata, 7–8 mm. longa; stamina 10, petalis breviora, longissima 6 mm. longa; antherae rotundatae; styli 2, stamina paulo superantes; ovarium 2-loculare. Infructescentia ferrugineo-tomentosa; poma 1-sperma, ovoidea, 7–9 mm. longa, calyce persistente reflexo coronata, rubra esse videntur, glabra; semina magna, testa membranacea; cotyledones magis incrassati hemisphaerici.

CHINA: Yunnan; Szemao, *A. Henry*, nos. 13018, 11644, 11644A.

Eriobotrya bengalensis Hooker f., Fl. Brit. Ind. II. 371 (1878).—Brandis, Ind. Trees, 290 (1906).

Mespilus bengalensis Roxburgh, Cat. Hort. Bengal. 38 (1814), nom. nud.; Fl. Ind. ed. 2, II. 510 (1832).

Photinia dubia Wallich, Cat. 6682–6684 (1829).

Eriobotrya dubia Decaisne in Nouv. Arch. Mus. Paris, X. 145 (1874), pro parte.—Kurz, Forest Fl. Brit. Burma, I. 443 (1877).—Franchet, Pl. Delavay. I. 224 (1890).

CHINA: prov. Yunnan, Szemao, *A. Henry*, no. 12842, 12139.

Eriobotrya bengalensis var. **angustifolia** Cardot in Lecomte, Not. Syst. III. 371 (1918).

CHINA: Yunnan; Hay-y, *Paul Ngueou; Ducloux*, no. 4719.

Eriobotrya buisanensis Kanehira, Formos. Trees, 218, (1918), pro syn. *Photiniae buisanensis*.

Photinia buisanensis Hayata, Icon. Pl. Formos. III. 100 (1913).

Eriobotrya deflexa f. *buisanensis* Nakai in Tokyo Bot. Mag. XXX. 18 (1916).

Arbor; rami robusti glabri. Petioli 5–23 mm. longi, juvenilia fuscescente pilosi sed glabrescentes, lamina juvenilia utrinque rufo-tomentosa, adulta 5.5–13.3 cm. longa et 2.1–4.5 cm. lata, anguste oblonga vel lanceo-

lata, apice obtusa vel acuta aequaliter grosse crenato-serrata vel dimidio integra, coriacea lucida. Inflorescentia 3–4 cm. longa, adpresse fusco-pilosa. Bracteae et bracteolae lanceolatae, caducae; calycis tubus turbinatus, fusco-pilosus; lobi obtuse ovati vel oblongi dorso glabri vel subglabri margine et intus fusco-pilosi; petala alba late obovata apice bifida 7 mm. longa; styli bifidi, basi pilosi. Poma matura, 1.5 cm. lata, aurea edulia fragrantia.

FORMOSA: circa Kuraru prov. Koshun, *E. H. Wilson*, no. 11055; South Cape, *A. Henry*, nos. 282, 1333; Takao, *A. Henry*, no. 1026.

Eriobotrya tengyuehensis W. W. Smith in Notes Bot. Gard. Edinb. x. 30 (1917).

CHINA: prov. Yunnan, *G. Forrest*, nos. 9857, 9847, 12298.

Eriobotrya philippinensis Vidal, Rev. Pl. Vasc. Philip. 123 (1886).

PHILIPPINES: Isl. Luzon, mt. Umingan prov. Nueva Ecija, *M. Ramos & G. Edano*, no. 26443.

Eriobotrya acuminatissima Nakai, sp. nov.

Photinia luzoniensis var. *acuminatissima* Merrill in sched.

Differt ab *Eriobotrya luzoniensi* foliis majoribus longius acuminatis grossius serratis, floribus majoribus.

Rami cinerei, supra cicatrice foliorum rufo-tomentosi. Petioli 1.5–2.0 cm. longi, rubiginoso-tomentosi, lamina foliorum oblanceolata, 8–14 cm. longa et 2.7–4.7 cm. lata, apice acuminata, basi sensim attenuata, margine grosse incurvato-serrata, primo rubiginoso-tomentosa sed demum glabrescentia et supra lucida. Inflorescentia in apice rami conico-paniculata rubiginoso-tomentosa; bracteae deciduae; calyx dense rubiginoso-tomentosus; flores aperti non vidi.

PHILIPPINES: Isl. Luzon, mt. Salibongbong Capiz, prov. Panay, *A. Martelino & G. Edano*, no. 35622.

Eriobotrya fragrans Champion in Hooker, Kew Jour. Bot. iv. 80 (Fl. Hongkong.) (1852).—Bentham, Fl. Hongk. 108 (1861).—Walpers, Ann. iv. 670 (1857).—Maximowicz in Bull. Acad. Sci. St. Pétersb. xix. 177 (1873); in Mél. Biol. ix. 176 (1873).—Decaisne in Nouv. Arch. Mus. Paris, x. 145 (1874).—Hemsley in Jour. Linn. Soc. xxiii. 261 (1886).—Dunn & Tutcher in Kew Bull. Misc. Inform. add. ser. x. 97 (Fl. Kwangtung & Hongkong) (1912).

CHINA: prov. Kwang-tung, mt. Lah Jan circa Canton, *C. O. Levine*, no. 1557; Isl. Hongkong, *Ford*.

Eriobotrya deflexa Nakai in Tokyo Bot. Mag. xxx. 18 (1918), in nota.

Photinia deflexa Hemsley in Ann. Bot. ix. 153 (1895).—Henry in Trans. As. Soc. Jap. xxiv. suppl. 141 (List Pl. Formosa) (1896).—Matsumura & Hayata in Jour. Coll. Sci. Tokyo, xxii. 129 (Enum. Pl. Formos.) (1906).—Hayata, Icon. Pl. Formos. i. 246 (1911).—Koidzumi in Jour. Coll. Sci. Tokyo, xxxiv. art. 2, 65 (Consp. Rosac. Jap.) (1913).—Kanehira, Formos. Trees, 215, cum fig. (1918).

FORMOSA: Herinbi, prov. Taihoku, *E. H. Wilson*, no. 10185A; Taihei, prov. Giran, *E. H. Wilson*, no. 10185; Takow, *A. Henry*, no. 1026; Sozan, prov. Taihoku, *E. H. Wilson*, no. 10796; Hso-kei-ben, prov. Kagi, *E. H. Wilson*, no. 9805; Bankinsing, *A. Henry*, no. 498.

Eriobotrya deflexa var. **grandiflora** Nakai.

Eriobotrya grandiflora Rehder & Wilson in Sargent, Pl. Wilson. I. 193 (1912).—Schneider, Ill. Handb. Laubholzk. II. 999 (1912).

CHINA: prov. Szechuan, *E. H. Wilson*, no. 3506; Mupin, *E. H. Wilson*, no. 2999.

Eriobotrya ambigua Merrill (in Philipp. Bur. Governm. Labor. Bull. XXXV. 19 [1904]) has a bony endocarp and an ovary of 5 (3–4) cells, each cell containing 2 suprabasifix ovules. It should be removed to the genus Stranvaesia as **Stranvaesia ambigua** Nakai, comb. nov.

Eriobotrya Griffithii Franchet, Pl. Delav. I. 224 (1899), *E. lasiogyne* Franchet l. c. 225 and *E. prionophylla* Franchet l. c. belong to Photinia.

Eriobotrya has affinities with Photinia on one side and with Raphiolepis on the other. It has a persistent calyx though Decaisne described it as "Calyx 5-dentatus, marcescens vel deciduus." All known species of Eriobotrya have a persistent calyx. This persistency of the calyx is an important character in this genus and in Photinia and Pourthiaea, though it is not important in other genera of Pomaceae such as Pyrus, Malus and Sorbus.

SOME NEW AND NOTEWORTHY LIGNEOUS PLANTS OF EASTERN ASIA

T. NAKAI

Smilax japonica A. Gray in Perry, Narr. Exp. China Jap. 320 (1856).

Coprosmanthus japonicus Kunth, Enum. v. 268 (1850).

Smilax trinervula Miquel in Versl. Med. Kon. Akad. Weten. ser. 2, II. 867 (1867); in Ann. Mus. Lugd.-Bat. III. 150 (1867); Prol. Fl. Jap. 314 (1867).—Maximowicz in Bull. Acad. Sci. St. Pétersb. XVII. 171 (1871); in Mél. Biol. VIII. 408 (1871).—Franchet et Savatier, Enum. Pl. Jap. II. 50 (1879).—A. & C. de Candolle, Monog. Phaner. I. 207 (1878).—Makino in Tokyo Bot. Mag. IX. (112) (1895).

Smilax china var. *trinervula* Makino in Tokyo Bot. Mag. XIV. 184 (1900).

HONDO ET HOKKAIDO.

This is a more slender plant than *Smilax china* and has narrower leaves. The cells of the ovary have only one ovule each. There are two sheets of type specimens of *Smilax japonica* in the Gray Herbarium; one consists of two flowering specimens collected at Hakodate by S. W. Williams and Dr. J. Morrow and the other of two flowering specimens and one fruiting specimen collected on Webster Island near Shimoda (province Idzu) by C. Wright.

Chosenia eucalyptoides Nakai, comb. nov.

Salix eucalyptoides F. N. Meyer in litt. apud Schneider in Sargent, Pl. Wilson. III. 99 (1916).

Salix acutifolia Komarov. in Act. Hort. Petrop. XXII. 23 (1904), pro parte.—Nakai in Jour. Coll. Sci. Tokyo, XXXI. 215 (Fl. Kor. II) (1911); Veg. M't. Waigalbon 68, fig., (1916).—Non Willdenow.

Salix rorida Nakai, Veg. Diamond Mts. 169, no. 168 (1918).—Non Lackschewitz.

Salix splendida Nakai in Tokyo Bot. Mag. XXXII. 215 (1918).

Salix nobilis Nakai apud Wilson in Jour. Arn. Arb. I. 36 (1919), nom. nud.

Chosenia splendida Nakai in Tokyo Bot. Mag. XXIV. 68 (1920).

KOREA ET MANSHURIA.

Chosenia is a very remarkable genus of Salicaceae only recently discovered and without seeing the flowers no one would consider it distinct from Salix. The staminate catkins are drooping, the bracts are imbricated and membranaceous and the five stamens adhere halfway to the bracts. The female catkins also are drooping, the bracts are membranaceous and caducous and the two distinct styles are subterminal and articulated at the middle. I would like to make a new subfamily, Chosenieae, for this genus distinguished from Saliceae which would include Salix and Populus by the two distinct and articulated styles and by the ovary having neither a gland nor a cupula at the base. There is an analytical figure of a fruiting catkin drawn by C. Schneider in the herbarium of Arnold Arboretum, in which the scar of the bract is erroneously designated as the gland; this explains the fact that in his description of this species he attributes a gland to the pistillate flower.

Chosenia grows quickly and its trunk is straight becoming often more than 1 meter in diameter. The wood is the hardest of all known Salicaceous trees in Korea and is used especially for bridge building. The Japanese make wooden clogs from it. The fibres are used for making rope and sandals by the Koreans.

Celtis Leveillei Nakai in Tokyo Bot. Mag. XXIII (266) fig. 2, b. b. g. g. (1914).

Celtis Bungeana var. *heterophylla* Léveillé in *Fedde*, Rep. Nov. Spec. x. 476 (1912).

Celtis sinensis Nakai in Jour. Coll. Sci. Tokyo, XXXI. 192 (Fl. Kor. II.) (1911), pro parte.—Non Persoon.

Celtis Biondii var. *heterophylla* Schneider in Sargent, Pl. Wilson. III. 282 (1916).

This species is distinguished from *Celtis Biondii* by the following characters.

Celtis Biondii: Folia cum acumine 5–9 cm. longa, 3.5–5 cm. lata, adulta utrinque nervorum axillis infra barbatis exceptis glabra. Flores hermaphroditi; perianthii laciniae 2.5 mm. longae 0.5 mm. latae. Bacca nigra.

Celtis Leveillei: Folia cum acumine 2–8 cm. longa, 1–3.5 cm. lata, adulta supra sparse scaberulo-ciliata, infra ad venas primarias pilosa. Flores monoeici; perianthii laciniae 2 mm. longae 1 mm. latae. Bacca aurantiaca.

I had not seen flowers when I described this species in the Tokyo Botanical Magazine and may add the following description:

Flores masculi e gemmis baseos rami evoluti pauci; pedicelli 3 mm. longi, pilosi, graciles; perianthii laciniae elliptica vel obovato-oblongae, 2 mm. longae et 1 mm. latae, dorso pilosellae castaneae; stamina 4, laciniis

perianthii opposita, antheris ellipticis 1.5 mm. longis, filamentis 2 mm. longis glabris; ovarium abortivum subnullum barbatum. Flores feminei axillares; pedunculi 1–3 uniflori vel solitarii et biflori; pedicelli 5–12 mm. longi, graciles pilosi; perianthii laciniae ut in floribus masculis; stamina abortiva, antheris nullis vel parvis; ovarium ovoideum, dense varbatum, 1.5–2.0 mm. longum; styli alte bifidi; stigmata dorso lineari glabra, cetera dense ciliata, recurva.

Sequentes varietates distinctae adsunt:

Celtis Leveillei var. **heterophylla** Nakai, comb. nov.

Celtis Bungeana var. *heterophylla* Léveillé l. c.

Folia late obovata, apice subtruncato irregulariter serrata et in acumen subito contracta.

CHINA: Fokien, Dunn's Exped., Hongkong Herb. no. 3433.

QUELPAERT: in pago Tjy Yang Maui, *E. Taquet*, no. 3213; in silvis Sam Pang San, *E. Taquet*, no. 1385.

KOREA: in montibus Mokpo, *E. Taquet*, no. 2542; ibidem, *T. Ishidoya*, no. 1758.

I have seen this variety in South Korea: near Mokpo, Isl. Chito, Isl. Wangto, Kagen peninsula and Kainan county. It is a small tree about 10–20 feet high with grayish bark, and is found nearly always on rocky mountains.

Celtis Leveillei var. **holophylla** Nakai, var. nov.

Celtis Biondii Schneider in Sargent, Pl. Wilson. III. 272 (1916), excl. syn.?—Non Pampanini.

Folia oblonga vel obovata in acumen sensim attenuata, serrata vel subintegra.

CHINA: Hupeh: Ichang, *E. H. Wilson*, no. 249 (type), 2321; *A. Henry*, no. 3100. Kiangsu: Nanking, *F. N. Meyer*, no. 1425. Kiangsi: Kuling, *E. H. Wilson*, no. 1530; Lu Shan, *N. K. Ip*, no. 1124. Setchwan: sine loco speciali, *C. Bock & A. v. Rosthorn*, no. 301.

Celtis Cavaleriei Léveillé (*Celtis Biondii* var. *Cavaleriei* Schneider) is distinct from *Celtis Leveillei*. It has more distinctly serrate and broader leaves and the pedicels are twice as long.

Quercus Chenii Nakai, sp. nov. (§ Cerris).

Arbor rectaet usque ad 20–30 m. alta, trunco diametro 2.5 m.; cortex ut in *Quercu serrata* sed areolis minoribus; rami castanei; gemmae ovato-oblongae, acuminatae, 3–7 mm. longae. Folia lanceolata basi inaequalia, acuta vel obtusa, margine spinuloso-serrata, apice longe attenuata, venis lateralibus utrinque circiter 16 parallelis in spinulas terminantibus, 9–10 cm. longa, 22–25 mm. lata, petiolis 10–15 mm. longis. Fructus biennes subsessiles; cupula hemisphaerica, diametro 1.5 cm., 1 cm. alta, bracteis multiserialibus angustis recurvis sordide griseo-ciliatis 1–1.5 mm. latis; glans ellipsoidea, 2 cm. longa et 13 mm. lata, apice ciliata.

CHINA: Chekiang: Anchi Hsien, ubi sat vulgaris, *Y. Chen*.

This Oak is allied to *Quercus serrata* Thunb. (*Q. acutissima* Carruth.) but the leaves are glabrous from the beginning, the cupules and acorns are smaller and the involucral bracts are slenderer and shorter. The wood is used for the teeth of hulling mortars, for the spokes and the outer rim of wheels.

Quercus fokienensis Nakai, sp. nov. (§ Ilex.).

Quercus phillyraeoides Rehder & Wilson in Sargent, Pl. Wilson. III. 233 (1916), pro parte.—Non A. Gray.

Ramosissima; cortex atro-fusca; rami hornotini angulati, sordide fusco-stellato-pilosi vel tomentosi. Folia petiolis 1–3 mm. longis, obovata vel oblonga vel obovata vel oblanceolata, basi obtusa, rarius acuta, margine praeter basin minute argute serrulata, apice acuta vel acutissima vel obtusiuscula, supra lucida, costa stellato-pilosa excepta glaberrima, infra basi costae stellato-barbata excepta ab initio glaberrima, 3.5 cm. longa et 2.3 cm. lata (4.5–2.0; 5.5–2.2; 4.5–2.7; 2.5–1.4, etc.). Flores masculi ignoti; amenta feminea axillaria, 2–3 flora; pedunculi 2–4 mm. longi, fuscescenti-stellato-pilosi; involucrum circiter 1 mm. longum, fuscescenti-pilosum; ovarium pilosum; stigmata 2-labiata, glabra, recurva, 1 mm. longa. Fructus ignoti.

China. Fokien: Fokien, Dunn's Exped., Hongkong Herb. no. 3482 (type). Kweichou: inter oppida Tuyün et Patschai prope vicum Dodjie in silva xerophila, *H. Handel-Mazzetti*, no. 10762.

This species is nearest to *Quercus Gilliana* Rehd. & Wils. and *Q. phillyraeoides* A. Gray but by its mode of serration it is readily distinguishable from related species. There is one undeveloped fruit by which I could ascertain that the acorn of this Oak ripens the second year as in *Quercus phillyraeoides*.

Quercus Wrightii Nakai, sp. nov. (§ Ilex.).

Quercus phillyraeoides A. Gray in Mem. Am. Acad. n. ser. VI. 406 (1859), pro parte.

Quercus Ilex var. *phillyraeoides* Skan in Jour. Linn. Soc. XXVI. 516 (1899), quoad pl. e Liukiu.

Rami sordide fusci, adulti lenticellis albis punctati, juveniles fuscescenti-tomentosi; gemmae oblongae, squamis castaneis multis imbricatis. Petioli 2–5 mm. longi, minute ciliati sed demum subglabrescentes; lamina oblonga vel lineari-oblonga vel obovato-oblonga, 2–4.5 cm. longa et 1–1.5 cm. (interdum 7 mm.) lata, margine recurva, basi integerrima, apicem versus crenato-serrata, apice mucronata vel acuta vel obtusa, basi obtusa, supra glabra, infra stellato-pilosa vel tomentosa. Flores et fructi ignoti.

Kyushu.

Insula Tanegashima, prov. Osumi, *C. Wright* (type; Herb. Gray), insula Yakushima, prov. Osumi, *E. H. Wilson*, no. 6072.

This is nearest to *Quercus phillyraeoides* A. Gray which differs chiefly in the glabrous under side of the leaves. Wright's specimen has the leaves tomentose beneath and resembles some forms of *Quercus suber* L., but Wilson's specimen has the leaves less densely pubescent. *Quercus phil-*

lyraeoides is distributed from Kyushu proper eastward to the Boshu peninsula of Hondo. In province Idzu it is a very common plant along the sea-shore and Williams, Morrow and Wright collected the type specimens at Shimoda, the southernmost harbor of that province.

Quercus glandulifera Bl. var. **brevipetiolata** Nakai, comb. nov.

Quercus urticaefolia var. *brevipetiolata* A. De Candolle, Prodr. XVI. pt. 2, 16 (1864), excl. pl. Jap.

Quercus glandulifera Skan in Jour. Linn. Soc. XXVI. 514 (1899), pro parte.—Rehder & Wilson in Sargent, Pl. Wilson. III. 212 (1916), pro parte.—Rehder in Jour. Arnold Arb. IV. 160 (1923).—Vix Blume.

Petioli 2–5 mm. (rarius 6 mm.) longi. Folia oblanceolata vel oblonga-obovata, apice acuminata, basi vulgo obtusa vel subcordata inaequalia rarius acuta. Cupula et glans ut typica.

CHINA. Hupeh: in silvis Patung Hsien 700–1600 m., *E. H. Wilson*, nos. 519, 518; in silvis Chang Pang 1300 m., *E. H. Wilson*, no. 785; Ichang, *E. H. Wilson*, nos. 528, 3852, 3654, 3656; Hsing-Shan-Hsien 700–1600 m., *E. H. Wilson*, no. 3650; Hsing-Shan-Hsien 1300–1800 m., *E. H. Wilson*, no. 725; Fang Hsien 1000–1300 m., *E. H. Wilson*, no. 350; Fang Hsien 1000–1600 m., *E. H. Wilson*, no. 524; Hsing Shan Hsien 1000–1300 m., *E. H. Wilson*, no. 530; Chang Pang Hsien 700–1300 m., *E. H. Wilson*, no. 521, Ou-Tan-Scian 2090 m., *C. Silvestri*, no. 350; Kao-Kien Scien, *C. Silvestri*, no. 348. Shantung: Lau Shan, *F. N. Meyer*, no. 321. Honan: sine loco speciali, *J. Hers*, no. 36, 183 b; Tsi Yüan Hsien, Tien Tan Shan, *J. Hers*, no. 1892; Fu Niu Shan, *J. Hers*, no. 172; Lushih, Lao Kiün Shan, *J. Hers*, no. 1196. Kiangsu: Haichow, *J. Hers*, no. 2302; Shanghai, D. Macgregor, no. 9. Kiangsi: in silvis Kuling, *A. N. Steward*, no. 2718; Kiukiang, *A. Allison*, no. 7; Kuling, *E. H. Wilson*, no. 1500. Hunan: ad minas Hsikwangschan prope urbem Hsinhua, *Handel-Mazzetti*, no. 11929. Kweichou: in fruticetis ad vicum Gutscha prope urbem Kwei Yang, *H. Handel-Mazzetti*, no. 10490.

This seems to be the most common form of *Quercus glandulifera* in China. The typical *Q. glandulifera* growing in Japan, Quelpaert and Korea has long petioles (5–25 mm. long); leaves densely stellate-hairy beneath and the veins and veinlets are covered with silky hairs so that the leaves are silky when young. This typical form has not yet been found in China, but the following glabrescent variety occurs in many localities.

Quercus glandulifera var. **glanduligera** Nakai, comb. nov.

Quercus Griffithii var. *glanduligera* Franchet in Jour. Bot. XIII. 149 (1888).

Quercus glandulifera Skan in Jour. Linn. Soc. XXVI. 514 (1899), pro parte.—Rehder et Wilson in Sargent, Pl. Wilson. III. 212 (1916), pro parte.—Vix Blume.

Petioli elongati, 5–25 mm. longi. Folia oblonga-obovata vel late oblanceolata, subtus glauca vel glaucina vel viridia, sparsius stellulato-pilosa vel glabra, venis primariis tantum argenteo-hirsutis.

CHINA. Hupeh: Fang Hsien 1600 m., *E. H. Wilson*, nos. 350, 546; Chang Pang Hsien 300–1300 m., *E. H. Wilson*, no. 526; Ichang 700–1600

m., *E. H. Wilson*, no. 520. Szechuan: Wen-chuan Hsien, 2700–3000 m., *E. H. Wilson*, no. 3627; 1000–1900 m., *E. H. Wilson*, no. 1095 a; Kiating Fu, 300–700 m., *E. H. Wilson*, no. 3649; Wa-shan 1000–1600 m., *E. H. Wilson*, no. 1143; Mupin 1100–1600 m., *E. H. Wilson*, no. 1294.

Distylium gracile Nakai, sp. nov.

Distylium racemosum var. A. Gray in Mem. Am. Acad. n. ser. VI. 390 (1859).

Arborea 10 m. alta; trunco diametro circiter 70 cm.; rami graciles, hornotini stellulato-lepidoti, annotini irregulariter fissi. Folia late obovata vel obovato-rotundata apice mucronata vel obtusiuscula interdum obscure subtrilobata, 12–32 mm. longa et 7–22 mm. lata, supra lucida minute sparseque stellulata, infra fuscescentia, minutissime sparsimque stellulato-pilosa demum subglabrescentia. Flores ignoti. Fructus solitarius terminalis, pedunculo 0–10 mm. longo, ovoideus, usque 10 mm. longus et 7 mm. latus, extus dense fuscescenti-stellulato-lanatus, apice mucronatus, 2-locularis.

Formosa: prope Seisui, prov. Karenko, *E. H. Wilson*, no. 11107 (type).

Liukiu: sine loco speciali, *C. Wright*, (Herb. Gray).

Osteomeles boninensis Nakai, sp. nov.

Osteomeles anthyllidifolia var. ? *boninensis* Decaisne in Nouv. Arch. Mus. Paris, X. 184 (1874), nom. nud.

Osteomeles anthyllidifolia Maximowicz in Bull. Acad. Sci. St. Pétersb. XIX. 181 (1873); in Mél. Biol. IX. 182 (1873), pro parte.—Koidzumi in Jour. Coll. Sci. Tokyo, XXXIV. art. 2, 44 (Consp. Rosac. Jap.) (1913).—Non Lindley.

Differt ab *O. anthyllidifolia* foliolis multijugis 21–33 foliolatis proxime congestis lineari-oblongis non obovatis vulgo acutis.

Frutex erectus, usque 1.5–2.0 m. altus, ramis juvenilibus dense albo-sericeis. Stipulae deciduae, subulatae vel lanceolatae, 6–9 mm. longae, pilosae; folia 2–4.5 cm. longa ut petioli albo-sericea; foliola dense subimbricato-collocata, 21–33, vulgo lineari-oblonga interdum lineari-obovata sed terminalia oblongo-obovata, omnia acuta vel acuminata, supra glabra vel pilosella, lucida, subtus sericea. Corymbus foliosus pauciflorus, in apice rami hornotini terminalis, sericeus; calycis tubus sericeus, lobi lanceolato-acuminati, extus sericei, intus glaberrimi 2–3 mm. longi, reflexi; petala alba oblonga, 7–8 mm. longa et 3–4 mm. lata, obtusa; filamenta glabra; styli 5 basi sericei. Fructus rotundatus, pilosus, maturus, niger, edulis.

Bonin. Chichijima, *E. H. Wilson*, no. 8214 (type), *Rev. Gonzales*, 1917.

This plant is very common in Bonin Islands where a form of *Osteomeles subrotunda* K. Koch also grows. The latter, however, is a low procumbent shrub with more densely sericeous twigs and leaves, fewer (11–17) roundish leaflets. *Osteomeles boninensis* is not as hardy as *Osteomeles subrotunda* in Tokyo. Of the former there was once a cultivated plant in the Botanical Garden of the Tokyo Imperial University but it died nearly ten years ago.

Prunus incisa *Thunb.* var. **gracilis** *Nakai*, var. nov.

Rami cinereo-fuscescentes vel cinereo-castanei, lenticellis elevato-punctati; squamae gemmarum castaneae, deciduae, interiores villosae. Folia vix evoluta, inaequaliter serrata ad venas supra ut petioli pilosa, apice attenuata; petioli apice glandulis binis instructi; stipulae subulato-lanceolatae, laciniato-fimbriatae, apice glandulosae. Flores fasciculati vel breviter racemosi fere semper bini; bracteae subrotundatae, 2–3 mm. longae; pedunculi 1–6 mm. longi; pedicelli 12–18 mm. longi, sparsissime ciliati; calycis tubus tubuloso-ovoideus, 3 mm. longus, glaber, lobis oblongis margine pilosellis; petala 10–12 mm. longa, apice emarginata; stamina numerosa triserialia, glabra; antherae rotundatae; styli staminibus longiores, glabri; ovarium glabrum.

KYUSHU: Nagasaki culta, ex Osaka orta 1863, *C. J. Maximowicz.* (type in Herb. Gray, sub nom. *P. subhirtella*).

The specimens sent to the Gray Herbarium from the herbarium of the Botanic Gardens of Petrograd consist of three flowering branches; one being *Prunus aequinoctialis* var. *plena rosea* Miyoshi (in Tokyo Bot. Mag., XXXIV. 165 [1920]) which is a double-flowered form of *P. pendula* Maxim., and two of this variety. This variety resembles the type of *Prunus incisa* Thunberg to which Maximowicz has referred it in Bull. Acad. Sci. St. Pétersb. XXIX. 100; in Mél. Biol. XI. 693 [1883]), but in the type the pedicels are stouter and shorter and the calyx-tube is more elongated than in this variety.

Prunus macrophylla Sieb. & Zucc. var. **sphaerocarpa** Nakai, var. nov.

Prunus macrophylla Maximowicz in Bull. Acad. Sci. St. Pétersb. XXIX. 111 (1883); in Mél. Biol. XI. 710 (1883).—Non Siebold & Zuccarini.

Inflorescentia fere glabra tantum lineolis pilosis notata; calyx extus glaber, lobis margine barbatis; ovarium oblongum vel globosum, apice acuminatum vel acutum. Fructus globosi, 1 cm. longi.

KYUSHU: Nagasaki, *C. J. Maximowicz* (type in Herb. Gray).

The typical *Prunus macrophylla* has a pubescent inflorescence and oblong pointed fruits. Maximowicz mistook our variety for typical *Prunus macrophylla* and considered *Pygeum oxycarpum* Hance which is typical *P. macrophylla* a distinct species, *Prunus oxycarpum* Maxim.

Daphniphyllum macropodum Miq. var. **Lhuysii** Nakai, comb. nov.

Tetranthera Lhuysii Carrière in Rev. Hort. 1869, 368, f. 78.

Folia aureo- et albo-variegata.

In hortis cultum.

Turpinia ternata Nakai, sp. nov.

Turpinia pomifera β. *nepalensis* Maximowicz in Bull. Acad. Sci. St. Pétersb. XXIII. 27 (1886); in Mél. Biol. XII. 435 (1886), excl. plantis e China & India; non Hiern.

Turpinia pomifera Ito & Matsumura in Jour. Coll. Sci. Tokyo, XII. 390 (Tent. Fl. Lutch. 123) (1899).—Matsumura & Hayata in Jour. Coll. Sci. Tokyo, XXII. 98 (Enum. Pl. Formos.) (1906).—Shirasawa, Icon. Ess. For. Jap. II. t. 40, fig. 1–13 (1908).—Hayata, Icon. Pl. Formos. I. 160 (1911).—Non De Candolle.

Turpinia nepalensis Rehder & Wilson in Sargent, Pl. Wilson. II. 187 (1914), quoad pl. ex Liukiu.—Non Wallich.

Arbor dioica usque 10 m. alta, trunco ambitu 7 dm.; rami glaberrimi. Folia opposita, ternata vel superiora simplicia, glabra; petioli 1–9 cm. longi basi incrassati, teretes; foliola omnia petiolulata, stipitibus 0.5–3 cm. longis; lamina anguste oblonga vel oblongo-lanceolata, utrinque acuta vel acuminata, crenato-serrata, basi integra, 5–17 cm. longa et 2.8–6 cm. lata, infra pallidiora, venis elevatis. Inflorescentia terminalis vel subterminalis, fere glabra, decussato-paniculata; bracteae et bracteolae parvae, triangulares, deciduae; flores masculi sepalis 5 (4) imbricatis glabris vel margine ciliatis 1–1.5 mm. longis; petalis 5 (4) oblongo-subspathulatis ochroleucis vel albidis 2–3 mm. longis, staminibus 5 (4), antheris ovatis albis, pistillis abortivis; flores feminei sepalis 5 (4) oblongis vel ovato-oblongis 2–3 mm. longis, petalis ochroleucis vel albis 3–4 mm. longis, staminibus 5 (4), antheris ovatis; ovario globoso vel ovoideo glabro triloculari, stylo unico piloso, stigmatibus 3–4 lobatis. Fructus carnosi, aurantiaci, oblongo-sphaerici vel ovoidei, fere 1 cm. longa; testa seminum atro-fusca, nitida.

KYUSHU: mt. Kirishima 30–300 m., prov. Osumi, *Z. Tashiro* (type); Isl. Yakushima, *E. H. Wilson*, no. 6107.

LIUKIU: sine loco speciali (common. Yokohama Nursery Co.); Okinawa, Shuri, alt. 0–150 m., *E. H. Wilson*, no. 8169.

FORMOSA: Karenko to So-o prov. Karenko, *E. H. Wilson*, no. 11072.

Turpinia nepalensis Wallich is distinguished from this species by pinnate (3–9-foliolate) leaves and more hairy inflorescence. *Turpinia pomifera* De Candolle, too, is distinct, for it has pinnate leaves, more vigorous inflorescence and larger fruits (3–4 cm. in diameter). *Turpinia pomifera* is an East Indian plant, and *T. nepalensis* is distributed over East India, Himalaya, Nepal, China, and the Philippines. There is another new species in China, and one in the Philippine Islands which are described below.

Turpinia gracilis Nakai, sp. nov.

Planta omnibus partibus glaberrima; rami annotini fusci, hornotini virides, teretes. Folia 3–4-juga, imparipinnata; foliola terminalia petiolulis 2–28 mm. longis, lateralia petiolulis 1–6 mm. longis, omnia oblonga vel ovato-oblonga, apice attenuata, basi acuminata vel acuta, 23–90 cm. longa 8–39 mm. lata, minute crenato-serrata, infra pallidiora; panicula axillaris vel terminalis ramis gracilibus, 11–23 cm. longa; bracteae et bracteolae parvae, deciduae; pedicelli 1–1.5 mm. longi; sepala 5, exteriora 2 minora, late elliptica, interiora rotundata, margine alba, omnia 1.5 mm. longi; petala oblonga, sepala leviter superantia, vix 2 mm. longa; stamina 5, petalis fere aequilonga; antherae rotundatae minimae, biloculares; styli staminibus breviores vix 1 mm. longi; stigmata subdiscoidea; discus lobulatus. Bacca purpureo-nigra, 7 mm. lata.

CHINA. Yunnan: Szemao, *A. Henry*, nos. 12039 (type), 12039 b, 12039 c.

Turpinia lucida Nakai, sp. nov.

Rami triennes cinereo-castanei lucidi, hornotini et biennes virides. Folia 1–3-juga imparipinnata, glaberrima; petioli utrinque incrassati; foliola omnia petiolulata, elliptica, utrique mucronata, cum acumine 10–15 cm. longa et 5–7 cm. lata, coriacea, supra lucida, margine crenata. Inflorescentia pseudo-terminalis i. e. e gemmis binis in apice ramorum annotinorum oppositis oriens et perfecte evoluta, dum gemma terminalis foliifera crescere incipit, glaberrima, decussato-paniculata; bracteae et bracteolae minimae sub anthesi partim deciduae; flores fusci, suaveolentes (fide M. Adduru); masculi sepalis 5 ovatis vel rotundatis imbricatis 2 mm. longis, petalis oblongis 3 mm. longis, staminibus 5 petalis brevioribus, antheris late ovatis, carpellis 3, basi tantum coalitis, stylis 3 brevibus; stigmatis punctatis; flores feminei majores, sepalis 3 mm. longis, petalis 4 mm. longis, staminibus evolutis, ovario apice trilobato, stylis basi liberis, staminibus aequilongis, stigmatis discoides. Poma 17 mm. lata, globosa; testa seminum fusca.

PHILIPPINES: Isl. Luzon: prov. Cavite, *M. Ramos & D. Deroy*, no. 22585 (type), 22559; circa Penablanca, prov. Cagayan, *M. Adduru*, Arnold Arb. Coll., no. 273. Isl. Palawan: mt. Pulgar, prov. Palawan, *A. D. E. Elmer*, no. 13122.

Turpinia formosana Nakai, sp. nov.

Turpinia arguta Hayata, Icon. Pl. Formos. VIII. 32 (1919).—Kanehira, Formos. Trees, 161 (1918).—Non Seemann.

Arborea dioica, usque 10 m.; cortex glaber, cinerascens; rami glabri. Folia opposita, glaberrima, simplicia; petioli 0.5–5 cm. longi, utrinque incrassati, teretes; lamina 5–19 cm. longa et 2–8 cm. lata, crenato-serrata, apice obtuse acuminata, basi acuta vel rotundato-acuta, supra lucida, infra pallida, venis elevatis. Inflorescentia terminalis, glaberrima; bracteae et bracteolae minimae, caducae; flores masculi sepalis 5 (4) rotundatis vel oblongis margine ciliolatis 2–3 mm. longis, petalis 5 (4) 3–4 mm. longis oblongis vel oblongo-spathulatis ochroleucis, staminibus 5, antheris ovatis, pistillo abortivo; flores feminei ignoti. Fructus globosi, viridi-purpurei, diametro usque 1.5 cm., triloculares.

FORMOSA: prov. Taihoku, *E. H. Wilson*, no. 10130 (type); Bankinsing, *A. Henry*, no. 434; Arisan, *E. H. Wilson*, no. 10866, 9707.

This species is easily distinguished from *Turpinia arguta* by its small flowers.

Meliosma sinensis Nakai, sp. nov. (§ Pinnatae).

Meliosma Oldhami, Diels in Bot. Jahrb. XXIX. 452 (Fl. Centr. Chin) (1900).—Pampanini in Nuov. Giorn. Ital. n. ser. XVIII. 173 (1911).—Rehder & Wilson in Sargent, Pl. Wilson. II. 206 (1914), pro parte.—Non Maximowicz.

Arbor usque 20 m. alta, trunco diametro circiter 1 m. (fide E. H. Wilson) rami juveniles fusco-pilosi sed mox glabrescentes et cinerascentes; gemmae

nudae, fusco-tomentosae. Folia ramorum sterilium 4–7-jugo-imparipinnata; petioli 5–9 cm. longi axique glabri, teretes; foliola terminalia ovata vel obovata, petiolulis 1.5–2.0 cm. longis, apice mucronato-attenuata, basi acuta, crenato-apiculato-serrata, 11–12 cm. longa, supra viridia scaberula, infra pallida in axillis venarum primarium fuscescenti-tomentosa; foliola lateralia ad petiolum versus magnitudine decrescentia, petiolulis 3–5 mm. longis, anguste oblonga vel obovato-oblonga vel ovato-oblonga, 5–11 cm. longa et 3–4.5 cm. lata, costis sursum curvatis, serrulis et pilis ut in foliolo terminali, folia ramorum floriferorum 2–6-juga imparipinnata; foliola terminalia petiolulis circiter 1 cm. (0.5–1.2) longis, oblonga vel lineari-oblonga, apice subito attenuata, basi acuta, margine grosse crenato-apiculato-serrata, supra viridia parce scaberula, infra pallida in axillis venarum primarium parce pilosa. Panicula ampla terminalis, basi foliosa; axes parce pilosi vel subglabri; calyx 1 mm. longa; petala rotundata concava 2 mm. longa, alba; stamina glabra. Bacca nigra, 6–7 mm. longa.

China. Hupeh: Patung Hsien, *E. H. Wilson*, no. 3038 (type); Fang-Hsien, *E. H. Wilson*, nos. 463, 4602; Chang-Yang Hsien, *E. H. Wilson*, no. 3038; Chang Lo Hsien, *E. H. Wilson*, no. 3038 bis; Ma-Pau-Scien, *C. Silvestri*, no. 3355; sine loco speciali, *A. Henry*, no. 5863.

Kiangsi: Kuling, *E. H. Wilson*, no. 1650.

This is nearest to *Meliosma Oldhami* Miq. but is more glabrous in every respect. The hairs of the leaves are very remarkable; in *M. Oldhami* the lower surface of the leaves are covered by fine hairs throughout and the axils of the veins are glabrous while in this species the upper surface of the leaves has very short scabrous hairs and the lower surface has none except tufts of brownish hairs in the axils of the main veins. *Meliosma Oldhami* has also been found in China (near Nanking, prov. Kiang-si, *F. N. Meyer*, no. 1452; Lu Shan, *N. K. Ip*, no. 1109). *Meliosma Wallichii* was once confused with *M. Oldhami* by Hemsley, but that species has thick shining leaves; with the lower surface covered by a rusty tomentum and a rusty tomentose inflorescence.

Edgeworthia Meisn.

Caput pedunculo 9–11 cm. longo. Folia infra pilosa. Perigonii tubus 1.5–2 cm. longus, sericeus..... *E. longipes.*

Caput pedunculo 1–2 cm. longo.

Flores coetanei.

Folia subtus plus minus pilosa. Caput magnum; perigonium extus adpresse sericeum, intus flavum..... *E. Gardneri.*

Folia subtus glabra. Caput minus; perigonium extus albo-tomentosum, intus album..... *E. albiflora.*

Flores praecoces.

Rami robusti breviter ramosi, cicatricibus foliorum maximis. Foliainfra pilosa. Caput magnum; perigonii tubus argenteo-villosus, 3 mm. latus. *E. chrysantha.*

Rami graciles, cicatricibus foliorum parvis. Folia infra plus minus pilosa. Caput minus; perigonii tubus 2 mm. latus, extus sericeo-villosus. *E. tomentosa.*

Edgeworthia longipes Lace in Kew Bull. Misc. Inform. 1914, 380 [Decad. Kew. LXX. no. 829].

BURMA SUPERIOR.

Edgeworthia Gardneri Meisner in Denkschr. Bot. Ges. Regensb. III. 280, t. 8 (1841); in De Candolle Prodr. XIV. 543 (1857).—Hooker f., Fl. Brit. Ind. V. 195 (1886), excl. syn. *E. papyrifera*.

Daphne Gardneri Wallich in As. Research. XIII. 388, t. 9 (1820).

INDIA. Sikkim, Suriel, *E. H. Wilson*, Japoo (Government of India, Fl. Assam, no. 11457).

CHINA: Yunnan, sine loco speciali, *G. Forrest*, no. 9758.

Edgeworthia albiflora Nakai, sp. nov.

Frutex 1–5 m. alta (fide C. K. Schneider et Siméon Ten) trichotome ramosus; rami graciles fusci, lenticellis obscure sparsim punctati, cicatrices foliorum 1–2 mm. latae. Folia biennia, petiolis 2–10 mm. longis, oblanceolata, integra, 3.5–15 cm. longa et 1–6 cm. lata, apice acuta, basi attenuata, supra glabra viridia, infra glaucina glabra vel tantum ad costas pilis adspersa. Caput subterminalis, pedunculo 5–23 mm. longo sericeo; perigonium 13 mm. longum, extus albo-tomentosum, intus glabrum et fide Siméon Ten album, lobis 4, late ovatis acutis 3 mm. longis; stamina 8, biserialia, sessilia; antherae lineari-oblongae, acutae, basi obtusae, 1.5 mm. longae. Fructus perigonio persistente inclusus supra medium sericeus, ovoideus, 4 mm. longus; testa seminum nigra.

CHINA. Yunnan: prope Peyentsin, *Siméon Ten*, no. 19 (type). Szechuan: inter Paikuo wan et Moso Ying, *C. Schneider*. no, 661; circa Te chang, *C. Schneider*, no. 4058.

Edgeworthia chrysantha Lindley in Jour. Hort. Soc. Lond. I. 148 (1846); in Bot. Reg. XXXIII. 7 et 48 (1848).—Meisner in De Candolle, Prodr. XIV. 543 (1857).—Hemsley in Jour. Linn. Soc. XXVI. 401 (1894).—Pritzel in Bot. Jahrb. XXIX. 480 (1900).—Rehder in Sargent, Pl. Wilson. II. 550 (1916).

Edgeworthia Gardneri Hemsley in Jour. Linn. Soc. XXVI. 396 (1891), excl. syn. *E. papyrifera*.—Non Meisner.

CHINA. Hupeh: Ichang, cult., *E. H. Wilson*, no. 3555; *Veitch* Exped. no. 4100. Kiang-si: Kuling, *E. H. Wilson*, no. 1582.

Edgeworthia papyrifera Siebold & Zuccarini in Abh. Akad. Muench. IV. pt. 3. 199 (Fl. Jap. Fam. Nat. II. 75) (1846).—Miquel in Ann. Mus. Ludg.-Bat. III. 135 (1867); Prol. Fl. Jap. 299 (1867).—Franchet & Savatier, Enum. Pl. Jap. I. 405 (1875).—Schneider, Ill. Handb. Laubholzk. II. 403 (1909).

Magnolia tomentosa Thunberg in Trans. Linn. Soc. II. 336 (1794), descript. tantum.

Magnolia sericea Thunberg, Pl. Jap. Nov. Sp. 8 (1824), nom. nud.

Daphne papyrifera Siebold in Verh. Bot. Genootsch. XII. pt. 1, 22 (Syn. Pl. Oecon. Jap.) (1830), nom. nud.

Edgeworthia chrysantha Matsumura, Ind. Pl. Jap. II. pt. 2, 388 (1912).—Non Lindley.

Edgeworthia tomentosa Nakai in Tokyo Bot. Mag. XXXIII. 206 (1919).

KYUSHU: prov. Osumi, mt. Kirishima, *E. H. Wilson*, no. 6204; in horto circa Nagasaki, prov. Hizen, *C. S. Sargent*.

HONDO: Nikko, cult., *J. G. Jack;* Sendai, cult., *J. G. Jack*.

The reason why *tomentosa* should not be taken up as the oldest specific name has been stated by Rehder (in Sargent, Pl. Wilson. II. 551 [1916]).

Elaeagnus kiusiana *Nakai*, sp. nov.

Elaeagno longipedi affinis sed foliis et floribus argenteo-lepidotis ovario angustiore exquo statim dignoscenda.

Rami biennes stellulis lepidotis atro-fuscis dense obtecti, teretes, hornotini stellulis argenteis et fuscis mixte obtecti. Folia annua; petioli 2–3 mm. longi, argenteo- vel fusco-lepidoti; lamina oblonga, basi obtusa vel subtruncata, rarius acuta, apice subito attenuata (sed in laminis minimis obtusa), supra viridia sparsissime argenteo-lepidota, infra toto argenteo-lepidota sed adulta saepe sparse lepidota, 1.2–9 cm. longa et 7–39 mm. lata. Flores axillares solitarii in basi ramorum longiorum positi vel in brevibus fere subterminales; pedicelli argenteo-lepidoti, 4–13 mm. longi, graciles; ovarium elongato-fusiforme, 3–4 mm. longum, in floribus masculis abortivum; tubus perigonii 7–8 mm. longus et 3–4 mm. latus, basi subito contractus, lobi 4, late ovati, 5 mm. longi, extus argenteo-lepidoti. Florens in mense Maio.

KYUSHU. prov. Buzen, *H. Sakurai*.

Wendlandia Heyneana *Wallich*, Cat. no. 6274 (1822), nomen.—Wight et Arnott, Prodr. Fl. Ind. Or. I. 406 (1831).

Wendlandia glabrata Hooker f., Fl. Brit. Ind. III. 39 (1880), excl. syn. *W. sumatrana* et *W. laevigata*.—Matsumura & Hayata in Jour. Coll. Sci. Tokyo, XXII. 184 (Enum. Pl. Formos.) (1906).—Hayata, Icon. Pl. Formos. II. 89 (1912).—Matsumura, Ind. Pl. Jap. II. pt. 2, 596 (1912).

LIUKIU: in silvis Oshima, *U. Faurie*, no. 4001; Isl. Genkwa, circa Okinawa, *E. H. Wilson*, no. 8085.

FORMOSA: South Cape, *A. Henry*, nos. 672, 924, 931; Kelung, *Warburg*, no. 9651; Kushaku, *U. Faurie*, no. 57; Horisha, *E. H. Wilson*, no. 10078.

This species has sessile flowers and is different from *Wendlandia glabrata* which has pedicellate ternate flowers. The leaves and inflorescence are more or less minutely velvety pilose (sometimes nearly glabrous). *Wendlandia sumatrana* Miquel is near to this species, but has rotundate stipules. *Wendlandia laevigata* Miquel is another ally, but it has the leaves and panicles yellowish pubescent. I have seen four specimens of Philippine Wendlandia named *Wendlandia glabrata*. They are all *Wendlandia luzoniensis* A. De. Candolle and I doubt whether *Wendlandia glabrata* really exists in the Philippine Islands.

ARNOLD ARBORETUM, *March, 1924*.

THE RHODODENDRONS OF HUPEH

ERNEST H. WILSON

The ascent of the Yangtsze River from its mouth to near the city of Ichang, a distance of nearly one thousand miles, is from the viewpoint of scenery an uninteresting journey. The mighty river flows through a vast alluvial valley created by itself and its tributary streams. Here and there as round Chinkiang and Kiukiang isolated hills and mountains jut out like islands in the sea but on the whole the country is rich agricultural land, flat, wearying and monotonous to the traveler, especially if the journey be made in winter. About forty miles below Ichang the scenery changes and the country becomes broken and picturesque. Around the city the hills are strikingly pyramidal in outline with prominent cliffs in the near distance. North, south and west of Ichang the country is cut up into an archipelago of peaks from 2000 to 4000 ft. high which are inextricably linked by spurs with mountain ranges that attain altitudes of from 7000 to 10000 ft. Such is the configuration of the whole of western Hupeh and the contiguous part of Szechuan to the eastern edge of the famed Red Basin. There is no level land in the entire region which is too wild and savage for extensive agricultural development, and with a marked absence of useful mineral deposits it is one of the poorest, most sparsely populated and least known parts of China. For these same reasons it is of particular interest to the botanist since the vegetation has been less molested there than in many other parts of that country. But even there every reasonably accessible bit of land either is, or has been, under cultivation though much of the country is of such a nature as to preclude the growing of crops even with Chinese patience and ingenuity.

Geologically speaking the whole region is made up mainly of Palaeozoic limestones capped with Mesozoic shales and sandstones, usually red in color, which weather into sandy clays. From the edge of the Red Basin of Szechuan to the city of Ichang, the Yangtsze River has forced its way through mountain ranges and flows through a series of wonderful gorges whose stupendous almost vertical cliffs are from 1000 to 2000 ft. high. At their lower levels all the small rivers and streams flow through narrow gorges bound in by steep cliffs. Indeed, bold cliffs are the outstanding feature of the topography of western Hupeh and the contiguous part of Szechuan. From the level of the Yangtsze River up to 3000 ft. altitude traveling is excessively arduous but above this it is not so tiring though in truth it is difficult enough. Where not under cultivation the hills and lower mountains are partly covered with woods of miscellaneous broadleaf trees, both evergreen and deciduous, with a great variety of shrubs and climbing plants on their margins and in the open country. Below 4000 ft. such Conifers as *Pinus Massoniana* Lamb., *Cupressus funebris* Endl., *Cunninghamia lanceolata* Hook. and *Keteleeria Davidiana* Beissn. are common. Above 6000 ft. *Pinus sinensis* Lamb. and *P. Armandi*

Franch. are common and the broadleaf trees are nearly all deciduous. At 8000 ft. and upwards the wooded regions are more extensive and several species of Fir and Spruce form fine forests. The open country above this altitude is clothed with Bamboos, a great variety of shrubs, coarse herbs and *Juniperus squamata* Lamb. but nowhere in this part of China can the vegetation be called alpine in character.

Below an altitude of 3000 ft. no broadleaf evergreen Rhododendron is found though the red-flowered *R. Simsii* Planch. belonging to the Azalea group abounds and in season the countryside is ablaze with its blossoms of intense color. On conglomerate rocks near Ichang the yellow-flowered *R. molle* G. Don grows sparingly. In rocky places among shrubs the lilac-flowered *R. Mariesii* Hemsl. & Wils. is found at elevations between 1000 and 3000 ft. In wet sheltered glens among a rich growth of evergreen broadleaf shrubs *R. pittosporaefolium* Hemsl. occurs as an occasional bush at altitudes between 3500 and 5000 ft. but is nowhere a common plant. It is in the copses and woods above 4000 ft. that evergreen broadleaf Rhododendrons grow in Hupeh. They increase in number as the altitude increases and are common between 6000 and 10000 ft. though never so abundant as they are in western Szechuan where they dominate the higher forests and form magnificent belts of color. In the woods and copses of Hupeh among broadleaf deciduous and evergreen trees they grow as scattered bushes or in small groups whereas in the coniferous forests they are a most important undergrowth often forming dense thickets. Above 8000 ft. Rhododendrons grow in more open country among other shrubs, and in rocky places where there are no trees to give it overhead shade *R. Fargesii* Franch. in pure stands often covers large areas.

I never met with *R. sutchuenense* Franch., *R. auriculatum* Hemsl., *R. discolor* Franch. or *R. Houlstonii* Hemsl. & Wils. elsewhere than in woods and forests but the other species often grow in places where they do not receive the overhead shelter of trees. Indeed, *R. Augustinii* Hemsl., *R ovatum* Planch. and *R. micranthum* Turcz. grow best on the edge of woods and on cliffs where they get almost complete exposure and are never found within the full shade of wood or forest. *R. Wilsonae* Hemsl. & Wils. likes the companionship of deciduous shrubs and small trees but not that of evergreens, be they broadleaf or coniferous. Woods in which Oaks are the dominant trees are a feature of the vegetation of Hupeh and it is in these that the Rhododendrons which do not grow above 7500 ft. altitude are most found, luxuriating in the thick layer of humus which covers the forest floor.

The most widely distributed of the endemic species are *R. hypoglaucum* Hemsl., *R. sutchuenense* Franch., *R. maculiferum* Franch. and *R. discolor* Franch. Very local is *R. auriculatum* Hemsl., known only from a few localities and in these quite rare. *R. sutchuenense* Franch. is found at the lowest altitudes of any of the evergreen broadleaf species and it is the first to open its blossoms; *R. maculiferum* Franch. and *R. Fargesii* Franch. grow

at higher elevations than other Hupeh Rhododendrons and next to them in this respect comes *R. adenopodum* Franch. No small-leaved Rhododendron of the class which covers so many hundreds of square miles of the Chino-Thibetan borderland has been discovered in western Hupeh or eastern Szechuan, neither can Rhododendrons be termed a dominant feature of the vegetation in these parts of China. They are, however, a fairly common and strikingly beautiful element of the flora.

Of the eighteen species nine are not known to grow elsewhere though one (*R. hypoglaucum* Hemsl.) is very closely related to a species indigenous in western Szechuan, and another (*R. Houlstonii* Hemsl. & Wils.) is very close of kin to *R. Fortunei* Lindl. of eastern China. *R. Augustinii* Hemsl. grows also in western Szechuan where it is rather rare and so, too, does *R. pittosporaefolium* Hemsl. which has also been found in Hunan province. Quite recently *R. Wilsonae* Hemsl. & Wils. has been found on the mountains of northern Kwangtung. Of the remaining six species, three (*R. ovatum* Planch., *R. Mariesii* Hemsl. & Wils. and *R. molle* G. Don) have their headquarters in eastern China and their western limits of distribution in Hupeh. One (*R. micranthum* Turcz.) is a wide-spread species in north China, Manchuria and Korea which has its southern limits in Hupeh; another (*R. yanthinum* Bur. & Franch.) is a western species with its eastern limits in Hupeh. The remaining species (*R. Simsii* Planch.) is universally distributed through all the warm temperate parts of China.

The first of the endemic species was discovered about 1886 by A. Henry who altogether brought five new species to our knowledge though one was not recognized until 1910. Père P. Farges in the neighborhood of Tchen-keou-ting discovered between 1891 and 1894 six new species. In 1900 I added *R. Wilsonae* Hemsl. & Wils. to the list. One species (*R. Augustinii* Hemsl.) was first introduced into cultivation by Père P. Farges who sent seeds to M. Maurice de Vilmorin in 1899. With the exception of *R. detersile* Franch. all the other species of the region were introduced into cultivation (twelve for the first time) by myself during 1900, 1901 and 1907 through seeds sent to Messrs. Veitch and to the Arnold Arboretum; also the stock of *R. Augustinii* Hemsl. in British and American gardens is from seeds collected by me. All the introduced species have flowered in Britain where they have proved as hardy as the rank and file of evergreen Rhododendrons, but in the Arnold Arboretum only one (*R. micranthum* Turcz.) will grow out-of-doors. Though comparatively few in number these Hupeh species are an important unit; several are in the front rank of the genus. The blue-flowered form of *R. Augustinii* Hemsl. is one of the most remarkable of Rhododendron and *R. auriculatum* Hemsl. is unique as the last of its race to open its flowers in summer. Late-flowering and beautiful is *R. discolor* Franch. and *R. Fargesii* Franch. is of its class one of the loveliest.

KEY TO THE SUBGENERA

Shrubs or trees with persistent, rarely deciduous, glabrous, lepidote or tomentose leaves; stamens 5–20; ovary glabrous, lepidote or tomentose, never setose,

sometimes more than 5-celled; corolla 5, 7 or 9-lobed; flowers terminal, rarely terminal and lateral.....I. *Eurhododendron.*

Shrubs with persistent or deciduous, non-lepidote leaves; ovary glabrous or tomentose, never setose or lepidote; corolla rotate, subrotate or funnelform-campanulate; stamens 5 or 10; flowers lateral, solitary or in fascicles of 2 or more. II. *Azaleastrum.*

Shrubs or small trees with deciduous, or persistent, strigose or villose, sometimes glabrous but never lepidote leaves; corolla funnelform to rotate, rarely campanulate; stamens 5–10; ovary usually strigose, rarely glabrous, never lepidote; flowers terminal.....III. *Anthodendron.*

Subgen. I. EURHODODENDRON Endl.

Rhododendron subgen. **Eurhododendron** Endlicher, Gen. Pl. 759 (1839), emended.

Rhododendron sect. I. *Ponticum* G. Don, Gen. Syst. III. 843 (1834), including sections II, III and IV.

Rhododendron sect. III. *Eurhododendron* De Candolle, Prodr. VII. 721 (1839), including sections I, II and IV.

KEY TO THE SECTIONS

Leaves persistent, glabrous or tomentose beneath, never lepidote; ovary glabrous, glandular or tomentose, never scaly; stamens 10 to 20; flowers several from a terminal bud.....1. *Leiorhodium.*

Leaves persistent, more or less clothed with lepidote glands; corolla rotate, campanulate or funnelform; stamens 10; ovary lepidote; flowers several from a terminal bud, rarely from terminal and lateral clustered buds...2. *Lepipherum.*

Sect. 1. Leiorhodium Rehd.

Rhododendron sect. **Leiorhodium** Rehder in Bailey, Stand. Cycl. Hort. v. 2937 (1916).

Rhododendron sect. *Eurhododendron* Maximowicz in Mém. Acad. Sci. St. Pétersb. sér. 7, XVI. no. 9, 14 (Rhod. As. Or.) (1870).—Not Endlicher.

KEY TO THE SPECIES

Corolla 5-lobed.

Leaves green on both surfaces.

Leaves glabrous, except midrib below.

Calyx annular, glabrous.....1. *R. sutchuenense.*

Calyx saucer-shape, villose.....2. *R. maculiferum.*

Leaves densely clothed with rufous, floccose tomentum on the under surface. 3. *R. detersile.*

Leaves pale gray or dun-colored on under surface.

Indumentum uniform, firm, crustaceous; calyx annular with 5 minute, erect teeth.....4. *R. hypoglaucum.*

Indumentum not uniform, floccose and crustaceous; calyx membranous with 5 prominent reflexed lobes.....5. *R. adenopodum.*

Corolla 7-lobed.

Leaves glabrous; petiole purplish, glabrous.

Calyx annular, obscurely toothed; pedicels glandular.

Flowers umbellate.....6. *R. Fargesii.*

Flowers racemose.....7. *R. Houlstonii.*

Calyx saucer-shape, membranous with undulate teeth; pedicels not glandular or very rarely so.....8. *R. discolor.*

Leaves hairy; petiole bearded, glandular.....9. *R. auriculatum.*

Rhododendron sutchuenense Franchet in Jour. de Bot. IX. 392 (1895).—Hemsley & Wilson in Kew Bull. Misc. Inform. 1910, 112.—Hemsley in Bot. Mag. CXXXVI. t. 8362 (1911).—Schneider, Ill. Handb. Laubholzk. II. 1045, fig. 615, f–g (1912).—Rehder & Wilson in Sargent, Pl. Wilson. I. 544 (1913).—Bean, Trees & Shrubs Brit. Isles, II. 382 (1914).—Rehder in Bailey, Stand. Cycl. Hort. V. 2940 (1916).—P. D. Williams in Rhod. Soc. Not. I. 39 (1916).—Millais, Rhodod. 249, t. facing p. 16 (1917).—McDouall in Gard. Chron. ser. 3, LXVII. 172 (1920); LXXI. 227, fig. 118 (1922).—Mottet in Rev. Hort. 1922, 150, fig. 50, t.—S. W. P. in Garden, LXXXVII. 159, fig. (1923).—Osborn in Gard. Chron. ser. 3, LXXIII. 171, fig. 78 (1923); in Garden, LXXXVII. 523, fig. (1923).

Rhododendron praevernum Hutchinson in Gard. Chron. ser. 3, LXVII. 127 (1920).—Garden, LXXXIV. 115, fig. (1920).—Armytage Moore in Rhod. Soc. Not. II. 77 (1922).—Osborn in Gard. Chron. ser. 3, LXXIII. 159, fig. 74 (1923); in Garden, LXXXVII. 521, fig. (1923).

Bush from 3 to 8 m. tall with many stout, ascending-spreading branches clothed when young with a gray scurf; winterbuds stout, subglobose to broadly ovoid, glabrous. Leaves tufted, coriaceous, oblong-oblanceolate, without petiole 10–25 cm. long, 3–7.5 cm. wide, rounded, apiculate, base cuneate, upper surface dark green, lower pale green, glabrous except the midrib on lower surface which is clad more or less densely with pale gray, floccose tomentum; petiole stout, flattened, 1–3 cm. long, often slightly winged. Flowers from 10 to 20 in a terminal, dense, umbellate raceme; rhachis 1–2.5 cm. long, pedicels stout, ascending-spreading, 1–2.5 cm. long, glabrous; calyx oblique, annular, minutely toothed, glabrous; corolla 5-lobed, pink to rosy lilac, campanulate, 5–7.5 cm. deep, 6–8 cm. wide, lower part of tube pubescent within blotched or spotted with dark red-purple on the posterior part, lobes broad, spreading, rounded, emarginate; stamens 14–18, of unequal length, shorter than corolla, filaments flattened, lower third puberulous, anthers oval, very dark; pistil glabrous, overtopping stamens but shorter than corolla, ovary ovoid, style stout, thickened upward, slightly curved; stigma red, capitate. Fruit brownish purple, oblique, oblong, 3–4 cm. long, 1–1.5 cm. wide, furrowed; seed shining brown, flattened, oblong, 5 mm. long, with prominent wing.

This is the most arborescent of the Hupeh species and is well distinguished by its stout branches, its large leaves, glabrous except the midrib on the lower surface, its many-flowered umbellate inflorescence and by its bell-shaped, 5-lobed corolla. It is a noble Rhododendron, wide-spread in western Hupeh and eastern Szechuan and common between elevations of from 4500 to 7600 ft. It is always found in mixed woods often growing under the shade of evergreen Oaks and among *Arundinaria nitida* Mitford and other thin-stemmed Bamboos. In fact it shares with *R. auriculatum* Hemsl. a greater love for shade than other Hupeh Rhododendrons. The leaves are tufted at the end of the branches, large, dark green often attenuate at the base and though the habit of growth is splendid the

plants look best when seen from above. The flowers are large, very numerous and crowded into a dense rounded truss, the color varies from pale to rose-pink and rosy lilac and the interior of the corolla may be spotted or blotched with maroon or red-purple. At the lowest altitudinal level at which it grows wild the flowers open early in April before the snow has finally disappeared. Higher up on the mountains the flowering is delayed until May but this species is the earliest of its class to open its flowers. This was the first Rhododendron I saw in Hupeh and it was in bloom on April 9, 1900.

Rhododendron sutchuenense was discovered by A. Henry in 1888 but was named from specimens gathered by Père P. Farges round Tchen-keou-ting between 1891 and 1894. It was introduced into cultivation by seeds (No. 517) collected by me in the autumn of 1900 and again (No. 1232) in that of 1901; these were sent to Messrs. Veitch. In 1907, I sent a large supply of seeds (No. 509) to the Arnold Arboretum and these were widely distributed. This Rhododendron flowered first in the Coombe Wood nursery in 1910 when the plants were quite small. It has now flowered freely in many gardens and has proved hardy in Great Britain.

Among the many plants that have flowered slight variation in the shape of the leaf-base, in degree of pubescence on the midrib, in the color of flowers and in the degree of spotting within the corolla-tube have been observed. Such individual differences must be expected when a species is raised in large quantities from seeds. For garden purposes it is convenient to distinguish such forms but it is well to remember that they have horticultural rather than botanical significance. In establishing this species Franchet did not mention the color of the flowers, that figured in the *Botanical Magazine* without a blotch in the corolla-tube may serve as the type though, as a matter of fact, in a wild state this is less common than the form with a wine-colored blotch which has been distinguished as:—

Rhododendron sutchuenense var. **Geraldii** Hutchinson in Gard. Chron. ser. 3, LXVII. 128 (1920).

The *R. praevernum* Hutchinson belongs here though its author would have us regard it as a distinct species on account of its glabrous midrib, narrow leaf-base and flowers of a slightly different color. These differences are in themselves trivial and, moreover, inconstant.

According to Millais (*Rhodod.* 250) this species has been crossed with several Garden Rhododendrons at Caerhays Castle. No doubt this has been done in many other gardens, and there is a hybrid of this species with Rhododendron "Cornubia" named:—

Rhododendron cornsutch Magor in Rhod. Soc. Not. II. 120 (1922).

Rhododendron maculiferum Franchet in Jour. de Bot. IX. 393 (1895).—Hemsley & Wilson in Kew Bull. Misc. Inform. 1910, 107.—Rehder & Wilson in Sargent, Pl. Wilson. I. 531 (1913).—Millais, Rhodod. 205, fig. facing p. 24 (1917).

Bush from 1–7 m. tall (usually from 3 to 5 m.), wide-branching, the branches moderately stout, with or without a gray scurfy covering when young; winter-buds ovoid with glandular, ciliolate scales. Leaves coriaceous, glabrous, elliptic to oblong, sometimes broadest above the middle, without petiole 5–12 cm. long, 2.5–5.5 cm. wide, rounded, apiculate, base rounded or slightly subcordate, rarely oblique, upper surface dark green, lower pale green, midrib stout, prominent and clothed with floccose gray tomentum on lower surface; petiole stout, 1–2.5 cm. long, glabrescent. Flowers 6–12 in a terminal umbellate raceme; rhachis 1.5–3.5 cm. long and with pedicels densely clothed with rufous-gray villose hairs; pedicels ascending-spreading, 1–2.5 cm. long; calyx villose, saucer-shaped, with 5 small, unequal triangular teeth; corolla 5-lobed, white or pale pink with posterior blotch or spots of maroon near base, campanulate, 2.5–4.5 cm. deep and broad, lobes short, spreading, rounded, often emarginate; stamens 10, of unequal length, shorter than corolla, filaments flattened, slightly villose at base, anthers oval, very dark; pistil as long as corolla, ovary narrow-ovoid, clothed with rufous-gray villose pubescence, style reddish, filiform, stigma capitate.

This species is distinguished by the shape of its ample leaves, the midrib on the under surface broad and covered with floccose hairs, and by its villose rhachis, pedicel and ovary. The bell-shaped flowers are arranged in compact rounded trusses which terminate every shoot. It is a woodland plant, wide-spread and common between elevations of from 5000 to 10000 ft. throughout western Hupeh and contiguous Szechuan. It is most abundant in forests of *Abies Fargesii* Franch. associated with *Arundinaria Murielae* Gamble, above 8000 ft. altitude in Fang district. It is indeed a high-level species and with *R. Fargesii* Franch. is found at greater altitudes than any other Rhododendron in Hupeh. In a wild state it is in flower from mid-May until mid-June. Usually it is a bush from 8 to 15 ft. tall and broad but I once saw it 30 ft. high with a trunk 2 ft. in girth being quite tree-like in appearance.

This Rhododendron was discovered round Tchen-keou-ting by Père P. Farges sometime between 1891 and 1894; it was introduced into cultivation by seeds (No. 944) which I collected in the district of Changyang in December, 1900, and sent to Messrs. Veitch. All the plants in cultivation are of this origin. It flowered for the first time in gardens at Caerhays Castle. In Cornwall it flowers in late March and early April but in colder districts it will be found to blossom later. It is a hardy, sturdy species of good habit and abundant foliage. Though not one of the finest it is a very floriferous Rhododendron possessed of much quiet charm.

Rhododendron detersile Franchet in Jour. de Bot. XII. 260 (1898).—Millais, Rhodod. 154 (1917).

Bush about 1 m. tall, much branched, the branches clothed with rufous, floccose tomentum, when young, soon glabrous. Leaves lanceolate,

without petiole 4–6 cm. long, base truncate, apex obtuse with thickened mucro, margins revolute, upper surface smooth, lower clad with rufous floccose tomentum; petiole 0.3–0.4 cm. long, woolly. Flowers from 4 to 8 in a terminal cluster, pedicels 1.2–1.8 cm. long, clothed with pilose woolly hairs, calyx membranous, yellowish, lobes ovate-lanceolate, 0.3–0.4 cm. long, acute; corolla 5-lobed, pink, campanulate, about 3 cm. long, pubescent within on lower part, elsewhere glabrous; stamens 10, included, filaments pilose below; ovary glandular-pilose, style clad with long hairs near base. Fruit 1.2 cm. long, clothed with glandular and rufous pubescence.

This species was discovered near Touan-tchen in the district of Taning Hsien at an altitude of 2500 m. by Père P. Farges. Franchet states that it belongs to the same group as *R. Edgeworthii* Hook. f. and is distinguished by the smooth upper surface of the small leaves, by its rufous floccose tomentum which soon disappears and by the shape of its well-developed calyx. It is not in cultivation and is quite unknown to me.

Rhododendron hypoglaucum Hemsley in Jour. Linn. Soc. xxvi. 25 (1889).—Diels in Bot. Jahrb. xxix. 512 (1910).—Bean in Flora & Sylva, iii. 164 (1905); Trees & Shrubs Brit. Isles, ii. 361 (1914).—Hemsley & Wilson in Kew Bull. Misc. Inform. 1910, 111.—Pampanini in Nuov. Giorn. Bot. Ital. n. ser. xvii. 683 (1910).—Rehder & Wilson in Sargent, Pl. Wilson. i. 527 (1913).—Hutchinson in Bot. Mag. cxlii. t. 8649 (1916).—Millais, Rhodod. 188 (1917).

Rhododendron gracilipes Franchet in Jour. de Bot. ix. 391 (1895).—Hutchinson in Millais, Rhodod. 174 (1917).

Rhododendron chionophyllum Diels in Bot. Jahrb. xxix. 512 (1900).—Hutchinson in Millais, Rhodod. 143 (1917).

Bush from 1.5 to 5 m. tall with the first year branches bright green, later pale gray; winterbuds elongate, acute, glabrous, the bud-scales finely ciliolate. Leaves coriaceous, rigid, oblong-elliptic to oblong-oblanceolate, without petiole, 5–12 cm. long, 2–4.5 cm. wide, acute, mucronate, base narrowed often cuneate, upper surface lustrous green with impressed midrib, lower completely covered with a white crustaceous indumentum; petiole stout, 1.5–2.5 cm. long, glabrous. Flowers 4 to 10 or more in an umbellate raceme; rhachis 1–2.5 cm. long; pedicels slender, 1–3.5 cm. long, pubescent and slightly glandular or glabrous; calyx minute, 5-toothed, glabrous or sparsely glandular pubescent, teeth often glandular-ciliolate; corolla 5-lobed, pink or white, funnelform, 3–4.5 cm. long, 3.5–5 cm. wide, the posterior part spotted with rose-color, sometimes sparsely pubescent near base within, lobes rounded; stamens usually 10, of unequal length, shorter than the corolla, filaments slightly pubescent near base, anthers rose-color; pistil slightly exserted, ovary narrow-ovoid, furrowed, glabrous or puberulous and glandular, style filiform, glabrous, stigma capitate, lobed. Fruit oblong-cylindric, 1–1.5 cm. long, 0.3–0.4 cm. wide, curved, furrowed, slightly verruculose; seed dark brown, 1–2 mm. long, oval, slightly compressed, wing minute.

This is well-distinguished from other Hupeh species by the white crustaceous covering on the under surface of the leaves. It is a very common species in western Hupeh between 4500 and 7000 ft. altitude and it grows in eastern Szechuan where it was found by Père P. Farges round Tchen-keou-ting in the northeast and by A. von Rosthorn near Nan-ch'uan Hsien in the southeast. Though it skirts it does not cross the Red Basin but is represented in western Szechuan by the closely related *R. argyrophyllum* Franchet. In many places *R. hypoglaucum* is very abundant, scattered through thin woods or at its altitudinal limits growing in open country among rocks. It is a much-branched plant of good habit sometimes 20 ft. tall and as much in diameter and is very floriferous with rather small flowers in a compact truss. Both white and pink-flowered forms grow wild being in fact equally common. The flowers open in May, are broader than deep and the corolla is narrowed abruptly to the base. The ovary and flower-stalks vary from glabrous to pubescent and glandular and the latter vary considerably in length.

This Rhododendron was first discovered in 1886 by A. Henry in the district of Patung and introduced into cultivation by seeds (No. 752) which I sent to Messrs. Veitch in the autumn of 1900. It first flowered under cultivation at Caerhays Castle in May, 1915, and was figured in the Botanical Magazine though the drawing is not very accurate. In a wild state the plants bloom from near the end of April until the end of May according to altitude.

The color of Hemsley's type is not given but for convenience's sake the form with white flowers may be distinguished as:—

Rhododendron hypoglaucum f. album Wilson, n. forma.

Rhododendron adenopodum Franchet in Jour. de Bot. IX. 391 (1895).—Bean in Gard. Chron. ser. 3, XLV. 291, fig. 125 (1909); in Kew Bull. Misc. Inform. 1914, 382; Trees & Shrubs Brit. Isles, II. 340 (1914).—Millais, Rhodod. 110 (1917).—J. C. Williams in Rhod. Soc. Not. I. 132 (1917).—Balfour f. in Rhod. Soc. Not. I. 148 (1917).

Bush from 1 to 4 m. tall with branches the first year more or less sparsely clothed with pale gray appressed tomentum through which are scattered glistening lepidote glands; winterbuds viscid, the lower bud-scales lanceolate and woolly. Leaves oblong-oblanceolate to oblong, without petiole 8–20 cm. long, 2–5 cm. wide, apex acute and mucronate; base usually narrowed, glabrous, shining green above, under surface densely covered with close, felted, gray to dun-colored tomentum; petiole stout, 1.5–2.5 cm. long, floccose, often glandular. Flowers 6 to 10 or more in an umbellate raceme; rhachis 2–3.5 cm. long; pedicels 2–4 cm. long, erect-spreading, densely stipitately glandular; calyx membranous, persistent, reflexed, lobes lanceolate to ovate, about 5 mm. long, acute villose and glandular without; corolla 5-lobed, pink, broad-funnelform, 4–6.5 cm. long and broad, the posterior part within spotted with maroon, slightly

villose near base, lobes rounded; stamens 10, of unequal length, shorter than corolla, filaments flattened, villose in lower part, anthers pale; pistil as long or nearly as long as the corolla, ovary ovoid, densely hispid, glandular, style curved, glabrous, stigma capitate, lobed. Fruit oblong-cylindric, 1.5 cm. long, 0.7 cm. wide, terete, setose, glandular; seed dark brown, narrow-ovoid, 1.5–2 mm. long, angular, acute, wing minute.

This species is easily recognized by the floccose gray to dun-colored tomentum on the under surface of the leaves, by its villose and glandular pedicels, its membranous reflexed calyx and by its oblong-cylindric hispid and glandular fruit. It was discovered in the neighborhood of Tchen-keou-ting, a district in the extreme northeastern Szechuan, by Père P. Farges. In Hupeh this Rhododendron is quite rare and is not known to grow south of the Yangtsze River. It is only known to me from two or three localities in the Hsing-shan district where it grows in thin woods among rocks between 5000 and 7000 ft. altitude. I first found it in flower in mid-May, 1900, and gathered herbarium specimens (No. 1161); in October of the same year I collected seeds (No. 505) and sent them to Messrs. Veitch. This was the first introduction of this Rhododendron into Europe and the plants in English gardens are all from this source. In 1901 Père Farges sent seeds to M. Maurice de Vilmorin at Les Barres where a plant grown in a pot in an unheated greenhouse flowered in 1909 for the first time in cultivation. Since then this Rhododendron has flowered at Caerhays, at Kew, and elsewhere. In a wild state this species blossoms during late April and May at the first burst of spring and not infrequently its flowers suffer from late frosts. The habit of this plant is somewhat ungainly, being tall and rather sparingly branched; the flower truss is loose and the color of the corolla varies from pale to rose-pink. The lustrous green upper surface and the gray under surface of the leaves form a pleasing contrast. It is very distinct from other Rhododendrons of central China and amongst the older and better known species reminds one of *R. Smirnovii* Trautv. native of the Caucasus Mountains.

Rhododendron Fargesii Franchet in Jour. de Bot. IX. 390 (1895).—Bois in Jour. Soc. Hort. France, ser. 4, I. 217, fig. 24 (1900).—Hemsley & Wilson in Kew Bull. Misc. Inform. 1910, 109.—Watson in Gard. Chron. ser. 3, LI. 252 (1912).—Raffill in Gard. Chron. ser. 3, LII. 4, fig. 4 (1912).—Rehder & Wilson in Sargent, Pl. Wilson. I. 540 (1913).—Bean, Trees & Shrubs Brit. Isles, II. 354 (1914); in Gard. Chron. ser. 3, LXXI. 239, fig. 125 (1922).—Hutchinson in Bot. Mag. CXLIII. t. 8736 (1917).—Millais, Rhodod. 162, fig. facing p. 246 (1917), excluding reference to Forrest's Yunnan plant.—Garden, LXXXIV. 403, fig. (1920).—Magor in Gard. Chron. ser. 3, LXXI. 42, fig. 21 (1922).

Bush from 1 to 6 m. tall with many moderately thick, glabrous branches, often bloomy purple the first year; winterbuds ovoid to subglobose, glabrous. Leaves tufted, coriaceous, glabrous, elliptic to oblong-

elliptic, without petiole 3–10 cm. long, 1.5–4.5 cm. wide, rounded, mucronate, base abruptly rounded, truncate or sub-cordate, upper surface dark green, lower pallid; petiole purplish, 1–3 cm. long. Flowers 6–12 in a terminal umbellate cluster; pedicel 1–2.5 cm. long, stipitate-glandular; calyx annular, obscurely lobed, glandular; corolla 7-lobed, pink to rose-red, sometimes white, spotted with rose-red on posterior segment, wide-funnelform, 3–6 cm. deep, 4–7 cm. wide, lobes short, rounded, spreading; stamens about 14, of unequal length, shorter than corolla, filaments glabrous, anthers dark, oval; pistil nearly as long as corolla, ovary ovoid, glandular, style reddish, curved, glabrous, stigma capitate, lobed.

This beautiful species is easily recognized among other Hupeh Rhododendrons by the shape and relatively small size of its leaves, by its compact umbellate inflorescence and by its glandular pedicels and ovary. It grows wild on the high mountains of northwestern Hupeh and contiguous Szechuan and is not known to grow elsewhere, for the statement by Millais that Forrest found this species in Yunnan is erroneous. Père Farges reports it from a calcareous region but I never saw it growing either in or on limestone. Its altitudinal range is from 6500 to 9500 ft. though it is most plentiful round about elevations of 8000 ft. At the lowest level of its distribution this plant grows in mixed woods, higher up it is common in forests of *Abies Fargesii* Franch., *Pinus Armandi* Franch. and *Picea Wilsonii* Mast., *Populus tremula* var. *Davidiana* Schneid., *Betula albo-sinensis* Burkill and other trees. Above the level of forests it is abundant among shrubs and on the fully exposed slopes and mountain tops often forms extensive thickets. It is usually a bush from 6 to 10 ft. high and broad but often it is double these dimensions. The habit is good though the foliage is rather sparse and being small exposes clearly the polished branches. The flowers vary in color from pale-pink to rose-red, occasionally they are white and more or less dotted with rose-color. The plant is exceedingly floriferous, every shoot terminating in a dense rounded truss of flowers. So abundantly does it blossom that the bushes frequently exhaust themselves and die. The flowers open from the middle of May until the beginning of June often while snow still lays in shaded places.

This Rhododendron was discovered between 1891 and 1894 by Père P. Farges near the village of San-ken-cheou in the district of Taning in eastern Szechuan. It was found by me in Fang district in western Hupeh and introduced into cultivation by means of seeds (No. 1250) sent to Messrs. Veitch in the autumn of 1901. All the plants in gardens are from this source. It first flowered in Cornwall at Caerhays Castle in March, 1911, and about the same time in the garden of Mr. P. D. Williams at Lanarth.

Though not so valuable to gardens as the late-flowering *R. auriculatum* Hemsl. or *R. discolor* Franch. this Rhododendron is my favorite among

the Hupeh species. Its foliage and habit of growth, exuberance of blossoms, compact trusses and the cheery color of its flowers are pleasing qualities dear to me. It won my affection the first time I saw it capping a wind-swept ridge in May, 1901 and has held it ever since.

According to Millais this species has been crossed at Leonardslea with a blood-red form of *R. arboreum* Smith.

The form with white flowers spotted with rose-red may be distinguished as:—

Rhododendron Fargesii f. album Wilson, n. forma.

Rhododendron Houlstonii Hemsley & Wilson in Kew Bull. Misc. Inform. 1910, 110.—Bean, Trees & Shrubs Brit. Isles, II. 361 (1914); in Rhod. Soc. Not. I. 189 (1918).—Magor in Rhod. Soc. Not. II. 120 (1922).
Rhododendron Fortunei var. *Houlstonii* Rehder & Wilson in Sargent, Pl. Wilson. I. 541 (1913).—Millais, Rhodod. 169 (1917).

Bush from 2 to 4 m. tall, wide-branching, with many moderately stout stems, glabrous, often reddish and bloomy the first year; winter-buds ovoid, glabrous or puberulous. Leaves coriaceous, glabrous, oblong-oblanceolate to elliptic-oblong, without petiole 7.5–15 cm. long, 2.5–4 cm. wide, rounded, short apiculate, base rounded or cuneate, sometimes oblique, dark green above, under surface pallid; petiole purplish, 1.5–2.5 cm. long. Flowers from 6 to 10 or more in a terminal umbellate raceme; rhachis 2–6 cm. long, glabrous; pedicel ascending-spreading, 2–4 cm. long, sparsely and densely glandular often stipitately so; calyx oblique, annular, minutely toothed, sparsely glandular; corolla 7-lobed, oblique in bud, pink, wide-funnelform, 4–6 cm. deep, 5–8 cm. wide, often with a few faint lines of mixed green and dull crimson on the posterior part, lobes erect-spreading, rounded or truncate; stamens 14, unequal in length, shorter than corolla, filaments pale, flattened, quite glabrous, anthers oval; pistil over-topping stamens, as long or nearly as long as the corolla, glandular, ovary ovoid, style greenish, stout, curved in upper part, stigma capitate. Fruit bloomy purple, oblong, 2.5–3 cm. long, 0.8 cm. wide, furrowed, smooth or glandular; seed shining pale brown, flattened, oblong, 0.4–0.6 cm. long, surrounded by a prominent wing.

A very beautiful species distinguished by its foliage, by its glandular pedicels, its nearly obsolete calyx and by its wide-funnelform nearly bell-shaped corolla with relatively short ascending-spreading lobes. It is a critical species closely related to *R. Fortunei* Lindl. and to *R. discolor* Franch. but flowers three weeks earlier than the former and six weeks earlier than the latter. Though nowhere common it is widespread in Hupeh and eastern Szechuan growing in mixed woods at elevation of from 4600 to 7000 ft. It is usually a shrub from 6 to 10 ft. tall and broad and I have not seen plants exceeding dimensions of 15 ft. The habit is compact and fairly dense and the trusses of flowers are borne well above the foliage. In color the flowers are most pleasing shades of pink and the marking when present is inconspicuous. The glands on the pedicels and pistil

may be sessile or stalked or both, and very numerous or sparse. The rank this plant is entitled to has puzzled me greatly but on the whole in the present state of our knowledge I think it is best considered as a distinct species. In habit of growth, in foliage and in form of inflorescence and in the color of its flowers I regard this as one of the prettiest of the Hupeh species. In a wild state the blossoms open in late April or early May and there is a danger in gardens of its flowers being injured by late frosts. It is essentially a woodland species where rock and abundant humus prevail. This Rhododendron was discovered by A. Henry on the borders of Changyang and Patung districts in 1888; it was introduced into cultivation by means of seeds (Nos. 648, 648a) which I collected in the Hsingshan district and sent to Messrs. Veitch in October, 1900. Plants flowered for the first time in cultivation in 1913 in Coombe Wood nursery.

Rhododendron discolor Franchet in Jour. de Bot. IX. 391 (1895).—Hemsley & Wilson in Kew Bull. Misc. Inform. 1910, 112.—Rehder & Wilson in Sargent, Pl. Wilson. I. 542 (1913).—Bean in Kew Bull. Misc. Inform. 1914, 383; Trees & Shrubs Brit. Isles, II. 353 (1914); in Rhod. Soc. Not. I. 190 (1918).—Millais, Rhodod. 155 (1917).—Hutchinson in Bot. Mag. CXLIII. t. 8696 (1917).—Chenault in Rev. Hort. 1918, 148, fig. 48–49.—Garden, LXXXIII. 503, fig. (1919); LXXXIV. 270, fig. (1920).—Dillistone in Garden, LXXXV. 346, fig. (1921).—Osborn in Gard. Chron. ser. 3, LXXII. 19, fig. 10 (1922).

Rhododendron mandarinorum Diels in Bot. Jahrb. XXIX. 510 (1900).—Hutchinson in Millais, Rhodod. 206 (1917).

Rhododendron Kirkii Hort. Veitch apud Millais, Rhodod. 169 (1917).—Bean in Rhod. Soc. Not. I. 190 (1918).—Armytage Moore in Rhod. Soc. Not. II. 76 (1922).

Rhododendron Fortunei var. *Kirkii* Millais, Rhodod. 169 (1917).

Bush 2–6 m. tall with stout shoots, glabrous, often bloomy the first year; winterbuds ovoid with ciliolate bud-scales. Leaves coriaceous, glabrous, oblong-elliptic, 10–25 cm. long, 2.5–7.5 cm. wide, obtuse, mucronate, base narrowed, often sub-auriculate, rarely truncate, upper surface dark rich green, under surface pallid; petiole stout, 2–3.5 cm. long, purple, often bloomy. Flowers fragrant, from 6 to 12 in a terminal umbellate raceme, rhachis 2–5 cm. long, glabrous, pedicel stout, ascending-spreading 1.5–4 cm. long, glabrous, occasionally glandular; calyx small, discoid, membranous, with gland-tipped undulate or triangular teeth; corolla deeply 7-lobed, white, pink or pink shading to white, wide-funnelform, from 6–10 cm. deep, 8–12 cm. wide, yellowish green within tube, lobes undulate, wide-spreading, rounded, emarginate or entire; stamens about 14, sub-equal in length, slightly exserted, much shorter than corolla, filaments flattened, glabrous, anthers pale yellow-brown, pistil much overtopping stamens; ovary ovoid, and with stout nearly straight style densely glandular; stigma large, capitate. Fruit woody, bloomy, oblique, purple, oblong, 3.5–5 cm. long, 1–2 cm. wide, furrowed, subtended by the persistent

calyx, seeds shining brown, oblong, flattened, 4–6 mm. long, immersed in a broad wing.

This common species in Hupeh is well distinguished from others by being everywhere glabrous, by its small, membranous, undulate persistent calyx and by its gland-dotted pistil. It is plentiful in the woodlands between elevations of from 4500 to 7000 ft. everywhere in western Hupeh and eastern Szechuan to the edge of the Red Basin. A robust plant of good habit it is usually a bush from 10 to 12 ft. high and as much or more in diameter but often these dimensions reach 20 ft. The foliage is bold and leathery and the contrast between the purple petioles, the dark green upper surface and pallid under surface of the leaves is pleasing. The flowers are large, usually more or less pink in the bud and becoming pure white when fully exposed, fragrant and compacted into a fine rounded truss. It opens its flowers and commences to grow late in June and on this account is of exceptional value, a fact fully appreciated by those who have this species growing in their gardens.

This Rhododendron was discovered in the neighborhood of Tchen-keou-ting by Père P. Farges between 1891 and 1894; it was introduced into gardens by means of seeds (Nos. 885, 855b) sent by me to Messrs. Veitch in the autumn of 1900. In 1907 I sent seeds to the Arnold Arboretum and these were distributed far and wide. It flowered for the first time in cultivation at Coombe Wood in June, 1911. In gardens this Rhododendron has proved very amenable, flowers in June and early July, and by many is considered one of the finest of the Chinese species.

In 1902, before I knew the identity of this Rhododendron I suggested to Messrs. Veitch that it be named "*R. Kirkii*" after my friend Dr. William Kirk, then of the Chinese Imperial Maritime Customs Service and stationed at Ichang. Later plants were distributed under this unpublished name and, unfortunately, a good deal of confusion has been quite innocently caused. The typical form has pale pink passing to pure white flowers. There is, however, a good pink form and this may be distinguished as:—

Rhododendron discolor f. **carneum** Wilson, n. forma.

There is a hybrid of *R. discolor* × *R. catawbiense* × ? which has been named:—

× **Rhododendron holmleaense** Rehder in Jour. Arnold Arb. III. 48 (1922).

This was raised in 1915 in the gardens of Professor Sargent, Holmlea, Brookline, Mass., where it flowered for the first time in 1921. It is a valuable hybrid but unfortunately precariously hardy in Massachusetts.

Another hybrid, the result of crossing the garden Rhododendron "Königin Carola" and *R. discolor* has been named:—

× **Rhododendron konigdis** Magor in Rhod. Soc. Not. II. 121 (1922).

The flowers are described as lilac-white, deeper in the bud, 8-lobed,

open campanulate with a large blotch of crimson and spots of the same color on the upper segments. Another plant had flowers the lightest shade of heliotrope with the segments spotted at the base with olive-green.

Rhododendron discolor has been hybridized with other Rhododendrons in many gardens though I do not know if the progeny has received names. Bean (in Rhod. Soc. Not. I. 191 (1918)) says, "Several crosses with *discolor* as one parent have been made at Kew chiefly with such garden varieties as "Pink Pearl," "Strategist," "Doncaster," "Memoir," etc. But it has also been hybridized with some species as *R. Griffithianum* (*Aucklandii*), *R. maximum* and *R. occidentale*, the last of course an Azalea."

Rhododendron auriculatum Hemsley in Jour. Linn. Soc. XXVI. 20 (1889).—Veitch in Jour. Hort. Soc. Lond. XXVIII. 64, fig. 25 (1903).—Bean in Flora & Sylva, III. 163 (1903); in Kew Bull. Misc. Inform. 1914, 201; Trees & Shrubs Brit. Isles, II. 343 (1914); in Gard. Chron. ser. 3, LX. 110 (1916); in Rhod. Soc. Not. I. 192 (1918).—Hemsley & Wilson in Kew Bull. Misc. Inform. 1910, 108.—Rehder & Wilson in Sargent, Pl. Wilson. I. 544 (1913).—Rehder in Bailey, Stand. Cycl. Hort. v. 2945 (1916).—Millais, Rhodod. 125, fig. facing p. 124 (1917).—Hutchinson in Bot. Mag. CXLV. t. 8786 (1919).—Waterer in Garden, LXXXVI. 455, fig. (1922).—Osborn in Garden, LXXXVII. 539, fig. (1923).

Bush from 2 to 7 m. tall with stout ascending-spreading stipitate-glandular branches; winterbuds ovoid, acuminate or acute, bud-scales aristate or acuminate. Leaves coriaceous, oblong, without petiole 12–30 cm. long, 4–10 cm. wide, rounded and apiculate at apex, base rounded, auricled, dull dark green, glabrescent above, under surface pale green, clothed more or less densely with rusty brown tomentum; lateral veins spreading and ascending-spreading, petiole stout, bearded and glandular. Flowers fragrant, 8–15 in an umbellate raceme, rhachis 4–6 cm. long and with stout, 2.5–3.5 cm. long, ascending-spreading pedicels densely covered with pilose and villose gland-tipped hairs; calyx discoid with short, membranous glandular-pubescent lobes; corolla 7-lobed, white or rose-pink, funnelform, 8–10 cm. long, 6–9 cm. wide, sparsely pubescent without, posterior part of tube splashed with green and rose-color in lower half, lobes rounded, spreading; stamens slightly exserted, about 14, filaments glabrous, anthers pale brown; pistil overtopping stamens but shorter than corolla, ovary ovoid, 0.7 cm. long, glandular; style stout, green, glandular; stigma capitate. Fruit purple with glaucous bloom, oblique, oblong, 3.5 cm. long, 1 cm. wide, terete; seeds pale brown, flattened, 0.4–0.6 cm. long, immersed in a large wing.

This magnificent species is well characterized by the hairiness of its foliage and flower stalks, by the cordate base of its oblong leaves and by its large funnelform, 7-lobed corolla. It is one of the finest of all the Chinese

Rhododendrons and is unique in the lateness of opening its flowers and in commencing the season's growth. In a wild state this species opens its flowers in late July or early in August but under cultivation this is sometimes delayed even into September. On the young growth the lower part is furnished with crimson, very glandular scale-leaves which are a conspicuous and attractive feature. The leaves are large and handsome, being sometimes fully a foot long and five inches wide. The flowers each 3 to 4 inches long and nearly as wide are pleasantly fragrant.

The species grows mainly in copses and woods where deciduous Oaks predominate at elevations between 5000 and 7000 ft. but is nowhere common. I have seen specimens growing in districts as far apart as Changyang in the south and Fang in the north but only once, and that in 1900, did I collect it in flower and fruit. The plant is more plentiful scattered through the wooded country round the hamlet of Kuan Pao on the border of Patung and Changyang districts than elsewhere so far as my knowledge goes. This is the type locality and it was here that I gathered the seeds. It is an arborescent shrub of excellent habit being sometimes 20 ft. tall and even more through the crown though usually its dimensions are round about 12 ft. The plant everywhere favors cool situations where the soil is rich in humus and where it is sheltered from strong winds.

This fine Rhododendron was discovered in 1885 by A. Henry on the mountains round Kuan Pao; it was introduced into cultivation by myself in 1900 by means of seeds (No. 920) collected in November and sent to Messrs. Veitch. A large number of seedlings were raised of which one hundred were planted out in Coombe Wood nursery and later distributed among British gardens where there are now growing many fine specimens. The best plants in cultivation are those at Caerhays where it flowered for the first time in September, 1912. Since that date it has flowered in many gardens and is well-known and esteemed one of the grandest of all Rhododendrons. The late-flowering character is of great importance and in the hands of hybridizers may lead to the evolving of a race of late August and September flowering Rhododendrons. At Caerhays Castle it has been crossed with *R. decorum* Franch. and according to Millais (Rhodod. 125 [1917]) the plants in 1915, their third season, showed 70 per cent *R. auriculatum* in the cross. At Kew according to Bean (in Rhod. Soc. Not. 1. 193 [1918]) this species has been crossed with *R. ponticum* Linn. Probably other attempts to hybridize it have been made and the results of these experiments will be watched for with great interest.

The form most usually seen wild and the only one that has flowered under cultivation has white flowers. There is, however, a wild form with rose-pink blossoms which may be distinguished as:—

Rhododendron auriculatum f. **roseum** Wilson, n. forma.

SECT. 2. **LEPIPHERUM** G. DON

Rhododendron sect. **Lepipherum** G. Don, Gen. Syst. III. 845 (1834).
Rhododendron sect. *Osmothamnus* Maximowicz in Mém. Acad. Sci. St. Pétersb. sér. 7, XVI. no. 9, 14 (Rhod. As. Or.) (1870), in part.

KEY TO THE SPECIES

Corolla funnelform-campanulate, filaments villose at base.
Shoots villose, not verrucose when young; midrib pilose or villose on under surface of leaf ..... 10. *R. Augustinii*.
Shoots not villose, densely verrucose when young; midrib glabrous on under surface of leaf ..... 11. *R. yanthinum*.
Corolla rotate-campanulate, filaments glabrous ..... 12. *R. micranthum*.

Rhododendron Augustinii Hemsley in Jour. Linn. Soc. XXVI. 19 (1899).—Vilmorin & Bois in Frut. Vilmorin. 173 (1904).—Bean in Flora & Sylva, III. 162, t. (1905); Trees & Shrubs Brit. Isles, II. 343 (1914).—Mottet in Rev. Hort. 1909, 18, fig. 6.—Hemsley & Wilson in Kew Bull. Misc. Inform. 1910, 114.—Raffill in Gard. Chron. ser. 3, LII. 4, fig. 3 (1912).—Rehder & Wilson in Sargent, Pl. Wilson. I. 524 (1913).—Craib in Bot. Mag. CXXXIX. t. 8497 (1913).—Rehder in Bailey, Stand. Cycl. Hort. V. 2938 (1916).—Magor in Rhod. Soc. Not. I. 24 (1916).—Millais, Rhodod. 124, fig. facing p. 24 (1917).—Balfour f. in Rhod. Soc. Not. I. 148 (1917).—Garden, LXXXV. 68, fig. (1921).

Bush from 1 to 6 m. tall with many twiggy branches, reddish and villose when young, later glabrous with gray peeling bark; winter-buds narrow-ovoid, acute, pubescent and glandular-lepidote. Leaves subcoriaceous, lanceolate to oblong-lanceolate, without petiole 3–10 cm. long, 1–3 cm. wide, acute or subacuminate, base narrow, often abruptly so, sometimes rounded or truncate, upper surface dark green more or less covered with appressed gray hairs, lower surface gray-brown densely covered with shining brown lepidote glands, midrib pilose or villose on basal half; petiole 0.5–1.5 cm. long, villose. Flower usually 3 in a terminal fascicle, rarely 6; pedicels ascending-spreading, 1–2.5 cm. long; lepidote, pubescent or glabrous; calyx minute, discoid, lepidote with 5 small ciliolate teeth; corolla 5-lobed, pale to dark rose-purple, sometimes blue-purple, occasionally white, wide-funnelform, 3–4.5 cm. long and broad, blotched on posterior part with greenish yellow or yellow-brown, tube narrowed, lobes spreading, rounded or sub-acute, margin undulate, usually more or less lepidote-glandular without; stamens 10, unequal in length, slightly exserted, filaments villose at base; pistil overtopping stamens, ovary narrow-ovoid, 5 mm. long, densely lepidote with few pilose hairs at base and apex, style curved, glabrous, stigma capitate, lobed. Fruit oblong-cylindric, 1–2 cm. long, 0.3–0.4 cm. wide, deeply furrowed, lepidote, rarely sparingly pilose, seed pale brown, ovoid, acute, wingless.

This is an exceedingly common species in Hupeh and is found on the mountains westward far into Szechuan. It is partial to the margins of woods but is happiest in open rocky situations where it is fully exposed

to the sun. In Hupeh it occurs between elevations of from 4000 to 7500 ft. and in northwestern Szechuan from 6000 to 9000 ft. Usually it is a much branched shrub of moderate size but frequently it is from 15 to 20 ft. tall and as much in diameter. The plants vary considerably in degree of hairiness but the pilose or villose midrib on the under surface of the leaf is a ready means of distinguishing *R. Augustinii* from all other related species. The fascicles are usually terminal and 3-flowered but on vigorous shoots often 6 flowers occur in each and lateral fascicles may also be present. The flowers vary in color from pale purple through deep rosy purple to lavender- and blue-purple, on some plants they are white. Some of the color forms, especially those bordering on blue, are very lovely. The species is very free-flowering and in a wild state blossoms during the month of May.

This Rhododendron was discovered in Patung district during 1886 by Augustine Henry whose Christian name it worthily bears. It was introduced into cultivation by Père P. Farges who, in 1899, sent seeds to M. Maurice de Vilmorin at Les Barres where a plant flowered for the first time in 1902. In 1900 from the Changyang district I sent seed (Nos. 517, 598) in quantity to Messrs. Veitch and in 1907 and 1908 from various localities in Hupeh and Szechuan to the Arnold Arboretum and all or nearly all the plants in British gardens are from these sources. This Rhododendron is now well established in many English gardens where it flowers freely each year and has won for itself a host of admirers.

In the most common color forms the flowers are shades of pale to rosy purple and this may be regarded as the type of the species.

The form with lavender- to blue-purple flowers may be distinguished as:—

Rhododendron Augustinii f. **violascens** Wilson, n. forma.

This Rhododendron is found mixed with the type throughout its distribution. Some fine forms have been raised from my seed No. 4238 collected in Wen-ch'uan district of northwest Szechuan in October, 1910. It is now well known in gardens where it is esteemed one of the loveliest of all.

A form with white flowers and less common than others is:—

Rhododendron Augustinii f. **album** Wilson, n. forma.

In the Rhodod. Soc. Not. II. 69 (1921) Magor tells of a hybrid between *R. oreostrephes* W. W. Smith × 4238 W. (*R. Augustinii* f. *violascens*). He describes the flowers as "five in a truss, palest light lilac (violet de cobalt) with a few spots of greenish brown on the upper segment, very broadly campanulate $1^{3}/_{10} \times 2\frac{1}{2}$ inches."

Rhododendron yanthinum Bureau & Franchet in Jour. de Bot. v. 94 (1891).—Rehder & Wilson in Sargent, Pl. Wilson. I. 518 (1913).—Bean, Trees & Shrubs Brit. Isles, II. 386 (1914).—Rehder in Bailey, Stand. Cycl. Hort. v. 2938 (1916).—Millais, Rhodod. 264 (1917).—Mottet in Rev. Hort. 1917, 348, t.

Rhododendron Benthamianum Hemsley in Kew Bull. Misc. Inform. 1907, 319; in Gard. Chron. ser. 3, XLVII. 4 (1910).—Hemsley & Wilson in Kew Bull. Misc. Inform. 1910, 115.—Millais, Rhodod. 128 (1917).

Rhododendron concinnum Hemsley & Wilson in Kew Bull. Misc. Inform. 1910, 115.—Not Hemsley.

Rhododendron atroviride Dunn in Jour. Linn. Soc. XXXIX. 484 (1911).

Bush from 1 to 4 m. tall with many thin but rigid branches which are densely verruculose the first year; winter-buds ovoid with lepidote bud-scales. Leaves coriaceous, elliptic-lanceolate to ovate-lanceolate, without petiole 2.5–7.5 cm. long, 1–4 cm. wide, acute, mucronate, base rounded or somewhat narrowed, dark green, lepidote, slightly rugulose above, under surface gray-green, densely covered with shining brown lepidote glands, midrib usually slightly pubescent on upper surface, glabrous on under surface; petiole 0.3–1 cm. long, lepidote. Flowers 4 to 10 in a terminal fascicle; pedicel 1–1.5 cm. long, lepidote; calyx discoid, lepidote, with 5 small acute teeth; corolla pale- to deep red-purple, rarely white, 5-lobed, wide-funnelform, 3–5 cm. long and broad, blotched on the posterior part with brown or greenish brown, more or less lepidote, rarely slightly pubescent without, tube narrowed, lobes wide-spreading; stamens 10, unequal in length, slightly exserted, filaments villose near base; pistil overtopping stamens, ovary ovoid, 0.3–0.5 cm. long, densely lepidote, style reddish, curved, glabrous, stigma capitate, lobed. Fruit slightly curved, oblong-cylindric, 1–1.5 cm. long, 0.3–0.4 cm. wide, densely lepidote-glandular; seed shining brown, ovoid, 1.5 mm. long, acute, wingless.

From the related *R. Augustinii* Hemsl. this Rhododendron is distinguished by its verrucose branchlets, its glabrous thicker, shorter and broader leaves, by the midrib not villose on under surface and by its many-flowered fascicles. It is an uncommon plant in Hupeh though it occurs on mountain cliffs between 5000 and 7000 ft. in Changyang district in the south and Fang in the north. Further north it has been collected in Shensi by W. Purdom who unfortunately gives no precise locality. However, *R. yanthinum* is really a western species which has its eastern limits of distribution in Hupeh. In western Szechuan it is abundant on the edge of woodlands and in thickets from Wa-shan and Mupin west to Tachien-lu between 5000 and 11000 ft. elevation. Usually it is a bush from 1.5–2.5 m. tall and about as much in diameter but sometimes it is double these dimensions. The branches though thin are rigid and numerous and the habit of the plant is compact. It flowers during May and June and at its altitudinal limits north of Tachien-lu I have gathered it in blossom as late as July 9.

This Rhododendron was discovered in the summer of 1890 in the neighborhood of Tachien-lu by Prince Henri d'Orleans; it was introduced into cultivation by seeds (No. 1433) collected by me on Wa-shan in October, 1903. The following year I sent more seeds to Messrs. Veitch and in 1908 and 1910 to the Arnold Arboretum. Plants raised by Messrs. Veitch flowered for the first time in May, 1907, at the Coombe Wood nursery.

The color of the flowers is not attractive and this species is the least desirable of the Rhododendrons of Hupeh.

The form with white flowers may be distinguished as:—

Rhododendron yanthinum f. album Wilson, n. forma.

The type of this form I gathered in Fang Hsien in May, 1907; I do not remember seeing a plant of the species with white flowers in western Szechuan though doubtless such do occur there.

Rhododendron micranthum Turczaninow in Bull. Soc. Nat. Moscou, x. no. 7, 155 (1837).—Wilson in Jour. Arnold Arb. iv. 42 (1923), where complete references and synonymy and a full account of the species are given.

Subgen. II. AZALEASTRUM Planch.

Rhododendron subgen. **Azaleastrum** Planchon in Rev. Hort. 1854, 43.—Maximowicz in Mém. Acad. Sci. St. Pétersb. sér. 7, xvi. no. 9, 15 (Rhod. As. Or.) (1870).—Rehder in Wilson & Rehder, Monog. Azal. 109, in text (1921).

Azaleastrum Rydberg in Mem. New York Bot. Gard. i. 297 (1900), as a genus.

KEY TO THE SECTIONS

Corolla rotate or subrotate; stamens 5; fruit sub-globose to broad ovoid. 1. *Euazaleastrum.*

Corolla funnelform to funnelform-campanulate; stamens 10; fruit spindle-form 2. *Choniastrum.*

Sect. 1. EUAZALEASTRUM Wils. n. sect.

Represented by.....13. *R. ovatum.*

Rhododendron ovatum Planchon in Rev. Hort. 1854, 43.—Maximowicz in Mém. Acad. Sci. St. Pétersb. sér. 7, xvi. no. 9, 45 (Rhod. As. Or.) (1870).—Hemsley in Jour. Linn. Soc. xxvi. 28 (1889).—Hemsley & Wilson in Kew Bull. Misc. Inform. 1910, 120.— Schneider, Ill. Handb. Laubholzk. ii. 509, fig. 333 k–l (1911).—Rehder & Wilson in Sargent, Pl. Wilson. i. 546 (1913).—Hayata, Icon. Pl. Formos. iii. 139 (1913).—Bean, Trees & Shrubs Brit. Isles, ii. 371 (1914).—P. D. Williams in Rhod. Soc. Not. i. 40 (1916).—Millais, Rhodod. 222, fig. facing p. 246 (1917).

Azalea ovata Lindley in Jour. Hort. Soc. Lond. i. 149 (1846).—Fortune in Jour. Hort. Soc. Lond. ii. 126, t. 2 (1847).—Hooker in Bot. Mag. lxxxiv. t. 5064 (1858).—Bentham, Fl. Hongk. 201 (1861).

Azalea myrtifolia Champion in Bot. Mag. lxxvii. sub. t. 4609 (1851).—Bentham in Hooker, Jour. Bot. Kew Gard. Misc. iv. 298 (1852).

Bush from 1 to 3 m. tall with many rigid, ascending-spreading, slender branches, glandular-setose when young. Leaves thinly coriaceous, violet-purple when young, dark lustrous green, glabrous at maturity, ovate, without petiole 2.5–5 cm. long, 1.5–2.5 cm. wide (rarely 6–7.5 cm. long, 3–5 cm. wide), short acuminate, emarginate, mucronate, base rounded or somewhat narrowed; midrib villose on upper surface; petiole 0.5–1

cm. long, villose when young. Flowers solitary, axillary, from buds near apex of previous season's growth; pedicels slender, 1–2.5 cm. long, densely clothed with short pilose-glandular hairs, at first sheathed in dry, pubescent bud-scales; calyx membranous, deeply 5-lobed, lobes oblong to broadly ovate, 0.4–0.6 cm. long, 0.2–0.4 cm. wide, sparsely glandular-ciliate; corolla deeply 5-lobed, pink to pale rosy-purple with a few darker colored dots on the posterior part, rotate, 2.5–3.5 cm. wide, lobes wide-spreading, rounded; stamens 5, filaments flattened, villose in lower half, pistil exserted, overtopping stamens, ovary subglobose, glandular, style slender, glabrous, stigma capitate, lobed. Fruit dark purple-brown, sub-globose, 0.5–0.6 cm. long and broad, glandular, partially enclosed within persistent, membranous calyx; seed minute, elongate, wingless.

This species is not uncommon between elevations of from 4000 to 7000 ft. in Hupeh but is not known to grow further west. It is distributed eastward to the shores of the Yellow Sea being found plentifully on the mountains of Kiangsu, Chekiang and Fokien provinces. It was originally known from the Chusan Islands but most probably only cultivated in the temple grounds of those sacred islands. On the mountains around Kuling it is particularly abundant round about 4000 ft. altitude. This Rhododendron also grows in Hongkong so Hupeh represents the northern as well as the western limits of its distribution.

It is a much branched, twiggy shrub seldom exceeding 8 ft. in height with rigid, ascending branches. The leaves are crowded at the ends of the branchlets and when young are a lovely violet-purple color. The flowers are flat of an undecided but pleasing shade of pink to pale rose-purple and open in May. In Hupeh it is partial to cliffs and rocky places where it grows mixed with other shrubs but is sheltered from strong winds.

This species was discovered on the Chusan Islands in the autumn of 1843 by Robert Fortune who sent seeds to the Horticultural Society of London the same year. Subsequently he found it wild on the mountains of the Chekiang province. Fortune tells of two forms, one with white and another with pink flowers. A white form is unknown to me in a living state.

Rhododendron ovatum was first found in Hupeh by A. Henry; in 1900 I sent seeds (No. 938) from the district of Changyang to Messrs. Veitch and in 1907 to the Arnold Arboretum from the same locality. Plants raised from my first consignment of seeds are thriving in Cornwall but have not proved very hardy in less favorable climates.

SECT. 2. CHONIASTRUM FRANCH.

Rhododendron sect. **Choniastrum** Franchet in Jour. de Bot. XII. 264 (1898), nomen.—Hemsley & Wilson in Kew Bull. Misc. Inform. 1910, 116.—Rehder & Wilson in Sargent, Pl. Wilson. I. 546 (1913), as sect. of Subgen. Azalea.

KEY TO THE SPECIES

Flowers in fascicles of 3 to several, stamens and pistil much longer than the corolla. 14. *R. pittosporaefolium.*
Flowers solitary, stamens shorter than the corolla.....15. *R. Wilsonae.*

Rhododendron pittosporaefolium Hemsley in Jour. Linn. Soc. xxvi. 29 (1889).—Diels in Bot. Jahrb. xxix. 515 (1900).—Bean in Flora & Sylva, iii. 164 (1905).—Schneider, Ill. Handb. Laubholzk. ii. 509, fig. 333 (1911).—Hutchinson in Millais, Rhodod. 225 (1917).

Rhododendron stamineum Hemsley & Wilson in Kew Bull. Misc. Inform. 1910, 116.—Rehder & Wilson in Sargent, Pl. Wilson. i. 546 (1913).—Hutchinson in Bot. Mag. cxli. t. 8601 (1915).—Non Franchet.

Rhododendron aucubaefolium Hemsley in Jour. Linn. Soc. xxvi. 19 (1889), as to the flowers, the leaves and shoot belong to *Daphniphyllum macropodum* Miquel.—Bean in Flora & Sylva, iii. 162 (1905).

Bush from 2 to 8 m. tall, with many spreading, slender, glabrous branches; winter-buds narrow-ovoid, glabrous. Leaves coriaceous, tufted, lustrous, glabrous, lanceolate to oblong, rarely broadest about the middle, without petiole 6–12 cm. long, 2–5 cm. wide, acuminate, base cuneate, rarely rounded; petiole 1–1.5 cm. long. Flowers fragrant, from 3 to 8 in axillary fascicles, the fascicles several and crowded together at the end of last season's growth; pedicels slender, 1–3 cm. long, glabrous; calyx glabrous, annular, with 5 small, unequal teeth; corolla white, sometimes suffused with pink, with yellow blotch on the posterior lobes, pointed in the bud, 2.5–3.5 cm. long, deeply 5-lobed, the lobes oblong, obtuse or sub-acute, spreading and recurving from a narrow, cylindric tube; stamens 10, much exserted, filaments flattened, short-pilose in lower half, anthers oval, yellowish, pistil glabrous, overtopping the stamens, 4–5.5 cm. long, ovary cylindric, 0.6 cm. long, 0.3 cm. wide, style filiform, stigma capitate. Fruit spindle-shaped, 2.5–4 cm. long, 0.4 cm. wide, furrowed, dehiscing from below upward, margins of the valve waved; seeds shining pale brown, flattened, oval, 0.3 cm. long, winged at either end.

This is a very remarkable species easily recognized by its fascicled flowers with spreading, recurving lobes and long exserted stamens and pistil. At one time I thought it the same as *R. stamineum* Franch., a Yunnan species and they are unquestionably very closely related but *R. stamineum*, as described, has much thinner leaves, smaller pink flowers, thirteen stamens and shorter genitalia. Experience has taught us that none of the Yunnan Rhododendrons extend into central China and, indeed, very few into western Szechuan as far north as Mt. Omei. Until both species are in cultivation, where their true relationship can be positively determined, it seems best to keep the two as distinct.

Hemsley's species is well-named for in foliage and habit it singularly resembles a Pittosporum. It is a broad, spreading shrub, sometimes 25 ft. high and as much in diameter, with shining green leaves crowded at the ends of the slender but rigid shoots. When young, and especially on seedling plants, the leaves are a rich bronze or of a purple hue and

strikingly handsome. Mature bushes flower abundantly and the pure white blossoms often flushed with pink are sweetly fragrant and very pretty with their long, and prominent stamens and spreading reflexed corolla-segments with a striking yellow blotch.

This is a low-level Rhododendron, wide-spread in western Hupeh to Mt. Omei and Mt. Wa in western Szechuan between elevations of from 4000 to 6000 ft. but nowhere plentiful. It also grows in southeastern Szechuan and in the southwestern part of Hunan province. It is usually found on cliffs in hot, moist valleys among an exuberant growth of shrubs, mostly evergreen in character. Specimens collected on Mt. Omei and Mt. Wa have thinner leaves which are much less obviously reticulated on the upper surface than is the case with specimens from Hupeh.

It was discovered by A. Henry between 1886 and 1888 on the borders of Changyang and Patung districts and was introduced into cultivation by seeds (No. 887) which I sent from the same locality to Messrs. Veitch in the autumn of 1900; in 1910 I sent seeds (No. 4268) from Mt. Omei to the Arnold Arboretum. Plants raised from the seeds sent in 1900 flowered for the first time in 1911 at Caerhays Castle.

Rhododendron Wilsonae Hemsley & Wilson in Kew Bull. Misc. Inform. 1910, 116.—Bean, Trees & Shrubs Brit. Isles, II. 386, (1914).—Millais, Rhodod. 262 (1917).

Bush from 1.5 to 3 m. tall with gray, slender, ascending-spreading glabrous branches; winter-buds elongate, acute with paleaceous scales. Leaves rigid-coriaceous, clustered into false verticils, ovate-lanceolate, without petiole 5–10 cm. long, 2–4 cm. wide, acuminate, base more or less cuneate, upper surface shining green, lower pale; petiole 0.5–1.2 cm. long. Flowers fragrant, solitary and axillary but clustered to form fascicles at the end of the last season's growth; pedicels glabrous, about 2 cm. long, sheathed in many shining reddish brown paleaceous, imbricated, acute bud-scales; calyx annular, 5-toothed or unequally 5-lobed, glabrous; corolla deeply 5-lobed, pink, funnelform, 2.5–3 cm. deep, 4–5 cm. wide, lobes rounded, spreading from a narrow tube, posterior lobe spotted with brown; stamens 10 of unequal length, longest as long or nearly as long as corolla, filaments flattened, slightly villose near base, anthers broadly oval; pistil glabrous, exceeding the stamens, ovary oblong, 0.7 cm. long; style slender, curved, stigma lobed. Fruit cylindric, about 3 cm. long, 0.5 cm. broad, furrowed.

This is a twiggy shrub seldom more than 6 ft. tall and very distinct with solitary, pink, deeply lobed flowers, the lobes spreading from a short narrow tube. It is the rarest of the Hupeh species, being only known from one locality in the Patung district where it grows with other shrubs and trees in rocky places between elevations of 5000 and 6500 ft. In 1917 it was found on the mountains of northern Kwangtung by Rudolf Mell. It was discovered by me late in April, 1900, and in the autumn of this same year I sent seeds (No. 886) to Messrs. Veitch. All the plants

in cultivation originated from these seeds. It flowered for the first time in cultivation in March, 1912, at Caerhays Castle in Cornwall. The young leaves on seedling plants are beautifully colored, shades of brownish or purplish crimson masking the deep green of the mature leaf. In gardens, as yet, this Rhododendron has hardly fulfilled expectations.

Subgen. III. ANTHODENDRON Endl.

Rhododendron subgen. **Anthodendron** Endlicher, Gen. 759 (1839).—Rehder in Wilson & Rehder, Monog. Azal. 115 (1921) where full synonymy and references with a complete description are given.

KEY TO THE SECTIONS

Flowers and leaves from the same bud.
- Shoots with flattened, appressed, bristle-like hairs; leaves persistent or sometimes deciduous, usually dimorphic, scattered on the branches, elliptic to lanceolate or oblanceolate.....1. *Tsutsutsi.*
- Shoots glabrous or villose, without bristle-like hairs; leaves deciduous, not dimorphic, in whorls at the end of the branchlets, scattered only on vigorous shoots, usually rhombic to obovate, rarely ovate.....2. *Sciadorhodion.*

Flowers from the terminal bud, leaves from lateral buds below: corolla funnelform; stamens 5.....3. *Pentanthera.*

Sect. 1. Tsutsutsi G. Don

Rhododendron sect. **Tsutsutsi** G. Don, Gen. Syst. III. 845 (1834), excluding Nos. 30, 31, 36, 39.—Wilson in Wilson & Rehder, Monog. Azal. 22 (1921) where complete synonymy and references are given.

Represented by.....16. *R. Simsii.*

Rhododendron Simsii Planchon in Fl. des Serr. IX. 78 (1854).—Wilson in Wilson & Rehder, Monog. Azal. 45 (1921), where complete references and synonymy and a full account of the species are given.

Sect. 2. SCIADORHODION Rehd. & Wils.

Rhododendron subgen. **Anthodendron** sect. 2. **Sciadorhodion** Rehder & Wilson in Wilson & Rehder, Monog. Azal. 79 (1921), where complete synonymy is given.

Represented by.....17. *R. Mariesii.*

Rhododendron Mariesii Hemsley & Wilson in Kew Bull. Misc. Inform. 1907, 244.—Wilson in Wilson & Rehder, Monog. Azal. 80 (1921), where complete references and synonymy and a full account of the species are given.

Sect. 3. Pentanthera G. Don

Rhododendron sect. **Pentanthera** G. Don, Gen. Syst. III. 846 (1834).—Rehder in Wilson & Rehder, Monog. Azal. 124 (1921), where full references and complete synonymy are given.

Represented by.....18. *R. molle.*

Rhododendron molle G. Don, Gen. Syst. III. 846 (1834).—Wilson in Wilson & Rehder, Monog. Azal. 95 (1921), where complete references and synonymy and a full account of the species are given.

THE LIGNEOUS FLORA OF RICH MOUNTAIN, ARKANSAS AND OKLAHOMA

ERNEST J. PALMER

That part of the Ozark region lying south of the Arkansas river, using the term Ozark in its broadest application to include all of the elevated and semi-mountainous country between the Mississippi lowlands and the Great Plains, comprises two rather distinct sub-regions, differing from each other in topography and geologic structure, as likewise from the more typical mountain and plateau sections to the north. On the eastern side in south-central Arkansas, the name Ouachita Mountains has been applied to a series of low hills separated by narrow rocky valleys, formed upon a varied series of early Paleozoic rocks ranging from shales, sandstones and quartzites to massive novaculite chert. These strata have been broken up, tilted and folded in a complex manner, and in places masses and dikes of eruptive rocks have been forced into them. Farther west in Arkansas and extending into eastern Oklahoma very different conditions are encountered. Here the mountain-making movements of late Cretaceous time, although probably connected with other disturbances on a larger scale beyond our area, seem locally to have spent their force in a series of radiating or parallel lines of faulting and upheavals, while leaving considerable sections of the country but little disturbed. The different nature of the strata encountered here, consisting of heavily bedded sandstones alternating with shale and occasional layers of coal and clay partings, of the Pennsylvanian series, has resulted after a long period of erosion in a quite distinct topography. The traveler entering this country from the north, after crossing the Boston Mountains in western Arkansas or skirting them in eastern Oklahoma, will be impressed at once with the change in the landscape. Instead of an extremely rugged country with a close alternation of hills, ridges and narrow valleys, all rather heavily wooded and with but little evidence of civilization or settlement, he here finds broad open spaces and rivers flowing not through wide alluvial valleys, except in the case of the Arkansas, but through level uplands of moderate elevation, many miles in extent, sparsely wooded and dotted over with villages and farms, while on all sides can be seen on the horizon the outlines of more or less distant ranges or isolated peaks and domes of conical or long canoe-shaped mountains.

Thomas Nuttall, the English naturalist, who came up the Arkansas river in 1819, and who was the first scientific traveler to visit this section, described the park-like aspect of the country in its then primitive condition, with its alternation of grassy prairies and groves of small trees, amongst which great herds of antelope and deer were grazing, and with buffalo and bear abundant at no great distance. In his Journal of travels, published in Philadelphia in 1821, there are also illustrations, from sketches made by the author, of several of the prominent mountains, including

the Maumelle, Magazine, and Cavanal Mountains, all of which it has been my pleasure to view and explore botanically during the past few years. The Indians and game which this famous early traveler so interestingly described are gone, and the land speculators, whom he mentions as already busy in his day, have passed also with their schemes into the limbo of the lost, although their tribe has not failed of increase. But the mountains remain in outline just as he saw them, with their flora at least intact and with their general aspect but lightly touched by the hand of time.

The hills and mountains of this part of the Ozark region are, as has been indicated, the result of the combined action of upthrow and erosion, their position and general character having been determined by lines of faulting which brought to the surface the thicker and more resistant strata. While naturally varying widely as to size and form, they may, in regard to the latter, be roughly grouped into three classes. First may be mentioned the isolated pointed or narrowly conical peaks, typically represented by the Maumelles, near Little Rock, and Pilot Knob, in Scott County, Arkansas. A second type is that of the flat-topped or table mountain, with considerable areas of comparatively level land at their summits. Magazine Mountain, in Logan County, Arkansas, is the best example of this class, and to it also belong the Short Mountains in Scott and Franklin Counties, as well as many others. The third and by far the commonest form is that of the long mountain or range with sharp or narrow keel-like summit, often extending more or less brokenly for many miles. Of this character are the Winding Stair and Kaimichi Mountains in Oklahoma, and the Poteau, Blackfork, and Rich Mountains across the boundary between that state and Arkansas. The last named, with the parallel ridge of the Blackfork, by reason of its accessibility has been more thoroughly explored botanically than most parts of this area, and since it is in many respects a typical locality, and also on account of the richness and peculiarly interesting character of its woody flora, a brief description of it will be given in this sketch.

About half way between Kansas City and its Gulf terminus at Port Arthur the Kansas City Southern railway reaches its highest level in crossing this part of the Ozarks near Eagle Gap. The elevation here is about 1750 feet (530 meters) above sea level, and from this point it begins to descend rapidly towards the Coastal plain. This north and south road, a short distance below Heavener, Oklahoma, turns sharply towards the state line, and for more than twenty miles (35 kilometers) runs nearly east and west, following a pass between the mountains, which offers the only practicable route without a wide detour or extensive tunneling. The grades here are steep in both directions, and if the traveler passes over it in daylight he has ample opportunity for viewing the general features of this interesting and picturesque part of the country. For several miles east from the village of Page, Oklahoma, the railway parallels the course of a small rocky creek, which diminishes rapidly as the ascent continues into a

rivulet, and except in rainy seasons into a dry ravine. At other times its waters may be seen dashing over the rocky bed, and occasionally spreading out into quite pools, with a border of small trees and shrubs growing amongst the masses and boulders of dark stained sandstone. The valley varies in width from a few rods to a quarter of a mile or more, and where it has not been cleared off is covered by a fine growth of Pine, Oaks, Hickories, Sweet Gum, Sugar Maple and many other trees, which will be mentioned in more detail later. Bounding the valley, and in places coming down almost to the margins of the stream, rise on both sides the steep slopes of the mountains. That on the north is Blackfork, and to the south lies Rich Mountain. The little stream between them bears the somewhat ambitious name of Big Creek, a title which would appear to be appropriate only at seasons when it carries the heavy run-off from the mountains after torrential rains. Many interesting plants, including a variety of trees and shrubs, grow along its margins, and some of them even amongst the water-worn rocks of its channel, where they are borne down and submerged by every flood.

Conspicuous amongst herbaceous plants along this rocky channel are the Willow-herb (*Dianthera americana* L.) and Letterman's Ironweed (*Vernonia Lettermanni* Engelm.). Two shrubs are also quite abundant here: the Silky Dogwood or Kinnikinnik (*Cornus obliqua*) and Ward's Willow (*Salix longipes* var. *Wardii*). This Willow, so common along many of the rocky streams of the Ozarks, sometimes becomes a small tree under favorable conditions, but here, by reason of being so frequently buffeted and broken down by the torrents, it seldom exceeds a meter or two in height and sends out many shoots from the old stumps. In foliage, too, it is rather a distinct form, perhaps worthy of segregation, the leaves being firmer and the shoots having smaller stipules than in the typical form. *Cephalanthus occidentalis*, *Alnus rugosa*, *Hamamelis vernalis*, *Callicarpa americana* and *Amorpha tennessensis* sometimes also venture into this perilous habitat, but they are more characteristic of the rocky margins of the stream, where they are dominant species, but where their sway is also disputed by many others. Occasionally the border of the channel or deep pools is demarked by low bluffs or huge boulders where shrubby specimens of *Amelanchier canadensis* or *Acer rubrum* like to grow. More frequently there is a wide low margin of gravel or coarse rubble, amongst which sand and silt have accumulated, and since it is frequently flooded and the ground water is always near the surface here, something like bog conditions prevail. A dense growth of shrubs and herbaceous plants occupy the less exposed spots of this peculiar flood plain. The royal fern and the pretty little *Iris cristata* Ait., *Viola blanda* Willd., and many other attractive flowering plants, including several orchids, may be found in such situations. Conspicuous shrubs and small trees are *Carpinus caroliniana*, *Ostrya virginiana*, *Cercis canadensis*, *Rhus Toxicodendron*, *Vaccinium stamineum*, *Xolisma ligustrina*, *Rhododendron roseum*, *R.*

oblongifolium, *Hypericum prolificum* and *Callicarpa americana*, and occasional specimens of *Quercus Phellos* and *Ilex opaca*, and in great abundance the woody vines, *Berchemia scandens* and *Vitis rotundifolia*.

In places where the rocky surface of the valley is slightly more elevated and consequently drier, other species are dominant. By reason of the sterile surface and frequent floods, most of the arborescent species attain only the size of shrubs, and the thicket formation continues. Here are found occasional Oaks and Hickories of several species, Winged Elm, Southern Hackberry (*Celtis laevigata*), Sycamore, Sweet Gum, Black Gum, Flowering Dogwood, Smooth and Copal Sumac, Fringe-tree or Old man's beard (*Chionanthus virginica*), Wafer Ash (*Ptelea trifoliata*), Gum-elastic Tree (*Bumelia lanuginosa*), *Crataegus spathulata* and the Saw Briar (*Smilax Bona-nox*). Other parts of the valley, above ordinary floods, and where the surface is covered with a fertile sandy loam, support a fine forest growth, in which several of the above species, growing to a larger size, are mingled with many others. Amongst the more important trees of this section are the Yellow Pine (*Pinus echinata*), Mocker-nut and Arkansas Hickories, White, Black, Spanish and Post Oaks, Sweet and Black Gum, Southern Linden (*Tilia floridana*), and Sugar Maple. Additional undershrubs of frequent occurrence are Spice-bush, Sassafras, Parsley-leaved Haw (*Crataegus apiifolia*) and Papaw. A few specimens of Beech were seen along the margins of the creek, but this tree is nowhere common in the locality, and has not been noted farther north. Along the upper part of the stream the Cucumber Tree (*Magnolia acuminata*) appears, and it becomes commoner as the divide is approached. It is not found in the lower part of the valley, but grows commonly on the north sides of the mountains, where it attains a much larger size. One other interesting shrub should be mentioned before leaving the valley. This is the northern Leatherwood (*Dirca palustris*), which was found growing along the creek margins at the base of a small rocky bluff.

Many of the trees and shrubs of the valley continue for a little distance up the mountain slopes, but as conditions change a large proportion of them disappear and give place to others. There is a marked difference in the character of the forest growth on the north and south slopes. This can be distinctly observed in a general way even by the traveler as he passes through the valley on the not too swiftly moving trains. As the village of Page is approached from the west, Blackfork Mountain looms up ahead like a great pyramid. It is in fact the end of a long sharp ridge which extends eastward for about 15 miles (25 kilometers) to Eagle Gap, and thence, more or less interruptedly for a greater distance in the same general direction, under the name of Fourche Mountain. For much of the distance the crest of the range rises 1000 to 1250 feet (300 to 380 meters) above the valley. Observing this slope from the train window, as it passes in panorama on the left, a thin covering of timber will be seen extending quite to the top, but in places there are spots devoid of trees,

and where the gray rock covers the surface. The forest consists of a mingled growth of pine and broad-leaved trees, the former standing out distinctly, on account of their greater height and dark foliage, from the more abundant Oaks, Hickories and a few other deciduous trees mingled with them. Turning to the other side, the north slope of Rich Mountain is in sight. This range begins several miles farther west in Oklahoma and parallels the Blackfork to the gap, where it bends sharply to the south and ends in a fish-hook-like curve, a part of which is locally known as Mount Mena, from the town of the same name in Arkansas. The western part of Rich Mountain somewhat exceeds in height the crest of Blackfork, and at its loftiest point, about eight miles west of the Arkansas-Oklahoma state line, it reaches the altitude of over 2850 feet (835 meters) above sea level at the Gulf of Mexico. And since this exceeds by a few feet the summit of Magazine Mountain in Arkansas, it has the distinction of being the highest point in the Ozark region. The forest growth on the north slope is not only denser than that of the south exposures, but it consists almost exclusively of deciduous trees, many of which attain a large size, and as we shall see on closer inspection, the composition is different and much richer in species.

As the south side of Blackfork Mountain is most accessible and has in consequence been more thoroughly explored than that of the opposite range, a brief description of this will be given. That quite similar conditions prevail on the corresponding side of Rich Mountain was indicated by casual inspection at several points.

The slope on these south exposures is steep and rather uniform in most places from base to summit. There are occasional outstanding ledges with vertical faces, but these are generally only a few feet in height, and the angle usually does not exceed twenty or thirty degrees. The rock formation seen on the surface consists almost exclusively of a rather dense finely grained sandstone, of light buff color on fresh fracture, but weathering to a dull gray, a color effect which is also enhanced by the covering of lichens on long exposed surfaces. In places the slope is covered with loose angular fragments of this stone, ranging in size from hand specimens to masses weighing several tons. These boulders piled upon each other at all angles over many rods of the surface, as is often the case, present a very curious appearance. They bear some resemblance to the coarser material left by terminal morains in the glaciated regions. Or perhaps they might better be compared to the packs of ice blocks that accumulate in some northern rivers after the break up of the winter accumulation. They probably owe their origin to the breaking down of layers of the heavily bedded sandstone alternating with shale, which were tilted at a high angle in the opposite direction to the slope of the mountain side. As the softer shale weathered out more rapidly it left the layers of sandstone standing as a hanging wall, which under the combined effect of gravity and erosion kept breaking off and shifting and sliding down the

slope, until the accumulation from different levels completely covered up the ledges and serve to protect them from further disintegration. The surface of these rock slides is often almost entirely barren of vegetation. A few herbs and shrubs, however, sometimes find foothold amongst the clefts. The little fern, *Polypodium polypodioides* Hitchc., frequently grows on the north faces of large boulders amongst the lichens and mosses. Stunted trees and shrubs cling to the margins and occasionally appear in spots where there is a little accumulation of finer material. *Quercus marilandica, Crataegus spathulata* and *Castanea ozarkensis* are frequently found in such situations. Over the greater portion of the mountain side, where the slope is not too steep for the accumulation of some soil, is found a rather open forest, in which the Pine (*Pinus echinata*) attains the largest size and generally far overtops the deciduous trees. Amongst the commonest species of the latter class here are *Carya alba, C. Buckleyi* var. *arkansana, Quercus alba, Q. stellata, Q. velutina, Q. marilandica, Q. borealis* var. *maxima* and *Robinia Pseudoacacia*. Smaller trees and shrubs growing here are *Ostrya virginiana, Ulmus alata, Celtis pumila* var. *georgiana, Sassafras officinalis, Quercus Muhlenbergii, Crataegus apiifolia, C. pagensis, Rubus Andrewsianus, Rhus Toxicodendron, Acer rubrum, Cornus florida, Vaccineum arboreum, V. stamineum, Bumelia lanuginosa* and *Viburnum rufidulum*. Where the slope is somewhat steeper, or where for some other reason the forest has not been able to take possession, there are thickets composed largely of shrubs and a few herbaceous species. These give place in spots to open rocky glades, where the flora is of a more xerophytic character, and to small areas where there is scarcely any ligneous growth, and upon which a grassy prairie flora prevails. The low and high Bush Huckleberries (*Vaccinium vacillans* var. *crinitum* and *V. stamineum*) abound in these thickets, as well as small specimens of the Tree Huckleberry (*V. arboreum*). Often also there are stunted specimens of the Black Locust, Blackjack, Post Oak, and small Plum and Haw bushes of several species. *Amorpha glabra* frequently grows here and in the edges of the glades, where it becomes a tall shrub from one to two meters in height. Amongst the rocks, where it has few competitors except the low Huckleberry, there are often large colonies of little spiny Rose (*Rosa subserrulata*). *Yucca glauca* is sometimes found in the glades, with *Agave virginica* L., *Opuntia humifusa, Hypericum cistifolium* and other plants of similar habitat. Here also was first noticed an unknown species of St. John's-wort, which is described in another part of this paper as *Hypericum oklahomense*. On the open rocky slopes and in the glades it is a low branching shrub, usually under half a meter in height, but in more favorable situations it becomes much taller.

Well up towards the top of the mountain and on its level summit the prairie openings are best developed. Such grasses as species of *Andropogon, Sporobolus* and *Sorghastrum* flourish here. There are scarcely any woody plants, except for a few low Huckleberry bushes and occasionally the little

St. Andrew's Cross (*Ascyrum hypericoides*) and the St. John's-wort referred to above. But there are a number of conspicuous flowering herbs, including *Viola pedata* L., *Kneiffia linifolia* Spach, and at a later season various species of *Aster*, *Solidago* and *Lespedeza*.

At the summit of the mountain, in a number of places, great masses of the heavily bedded hard sandstone stand out, tilted at high angles or sometimes almost perpendicular. The northern Red Oak (*Quercus borealis* var. *maxima*) grows frequently about these rocky ledges and on the steeper slopes near the top of the mountain. The Red Cedar (*Juniperus virginiana*) also occasionally occurs here, but is nowhere frequent. Wild animal life, formerly without doubt very abundant, seems singularly scarce, considering the apparently favorable environment. Besides insects, only a few lizards and snakes and a surprisingly small number of birds were seen. Amongst the last was a single wild turkey flushed from a thicket near the top towards the western end of the mountain.

In approaching the north side of Rich Mountain in the lower part of the valley, below the village of Page, which was the point from which most of our exploring trips started, a mile or two of comparatively level but broken ground must be traveled before the real climb begins. The surface here is rocky, much of it covered with loose rubble and cut up with small ravines. As it is also covered for the most part with a dense growth of small trees, shrubs and tangled vines, traveling, in the absence of a road or trail, is most difficult. Roads have been roughly cleared at intervals to bring logs down from the mountain side to the saw mills formerly operated at Page, and in a few places there are trails leading to the top. But if the explorer is more intent upon making discoveries than upon speed or comfort, he will not follow these far, but will strike out up one of the numerous deep ravines which scar the mountain side. For here will be found not only the most picturesque scenery but also the greatest abundance and variety of plant life. After heavy rainfalls great volumes of water rush down these channels, and in several of the deeper ones are the sources of small creeks, fed by perennial springs. At most seasons one may climb far without seeing a trace of running water, but upon scaling some ledge he will come upon a strong flowing stream dashing over moss covered rocks and ledges, with many miniature cascades and limpid pools, their margins and the rocky banks covered with a luxuriant growth of ferns, flowering herbs and shrubs. The Christmas Fern, Maidenhair Fern and Marginal Shield Fern are abundant here, and the wild Hydrangea (*Hydrangea arborescens*), Mockorange (*Philadelphus pubescens*), *Ilex caroliniana*, and sometimes the slender Strawberry-bush (*Evonymus americanus*), bent down in autumn with its load of beautiful carmine and orange fruit, grow pendent over the rocky ledges. Red and Sugar Maple, Chinquapin, Linden and several sorts of Hickories and Oaks grow along the margins and interlock their branches above the narrow channel. A little farther up the slope, if the season is early spring, may be seen a

gorgeous display of the blossoms of the Pink Azalea (*Rhododendron roseum*), its clusters of showy flowers terminating the still naked branches. The Flowering Dogwood and Juneberry (*Amelanchier canadensis*) also display their blossoms through the leafless woods at this time. A little later, in the same environment, bloom the Cucumber-tree (*Magnolia acuminata*), Chinquapin and Linden, the last, with the wild Grapes and the yellow-flowered Honeysuckle (*Lonicera flava*), filling the air with fragrance. Here and on the intervening slopes at these half way levels, grow many fine specimens of White and Black Oak, Linden, Black Gum and several kinds of Hickory, one of which may belong to an undescribed species.

Climbing laboriously a little farther over slippery ledges, tangled shrubbery and fallen logs, we may emerge upon one of the curious rubble fields or rock slides, similar to those described on the south slopes of Blackfork Mountain. But on this side they are usually of smaller extent and confined to the vicinity of the eroded stream channels. The rocks here are not quite so barren and destitute of plant life as on the south slopes. Near the margins and at intervals amongst the rocks numerous plants, including several shrubs and small trees have taken possession. A tall white-flowered Composite (*Polymnia canadensis* L.) is common, and vines of the Grape (*Vitis cordifolia*) trail over the rocks or climb over low bushes of Hydrangea, Bladdernut (*Staphylea trifolia*) and the prickly-fruited Gooseberry (*Ribes Cynosbati*). The last is very frequent and grows to a large size, some of the hispid canes being two or three meters in length and twenty to twenty-five millimeters in diameter. It was a great surprise to find this northern species growing here, and the curious way in which it has adapted itself to this unusual environment is no less interesting, There is little soil amongst the large sandstone blocks, but such as there is consists of leaf humus added to the sand from their disintegrating surfaces, and many of the rocks are moss grown and moist for a large part of the season. During rainy periods the waters, which emerge in the stream farther down, may be heard rushing and rumbling, probably several meters below, and the roots of these shrubs undoubtedly find their way amongst the crevices of the rocks to this water supply. Clambering slowly over these boulders, which is not without danger, especially in wet weather, when they are slippery and treacherous and a misstep might result in a broken limb, we may shortly come to a comparatively level bench, perhaps thirty or forty meters in depth, bounded by rocky ledges or a steep bank above, and partially enclosed on the sides, thus forming a small cove open to the north or lower slope of the mountain. Deposits of soil have accumulated here, washed down from the higher levels, and it has also been enriched with leaf mould of ages from the deciduous forest. By reason of the fertility of this soil, the more constant supply of moisture and protection afforded from the hot dry winds of summer, these coves support a particularly luxuriant and interesting flora. Here, in addition to many of the trees and shrubs previously mentioned, are found fine specimens of

the Black Walnut, Sugar Maple, White Ash and rarely the Umbrella-tree (*Magnolia tripetala*). Growing as a second layer or in the more open spots are the Papaw, Spicebush, Bladdernut, Southern Witch-hazel (*Hamamelis macrophylla*), Tear-blanket (*Aralia spinosa*) and Silverbell-tree (*Halesia monticola* var. *vestita*). Some of the Walnut trees attain a large size, having long escaped the woodman's axe by reason of their inaccessible situation. A few years ago a rough road was constructed more than half way up the mountain side, to bring down logs of this valuable timber. At the time of one of my visits a large pile of them was awaiting shipment near the railway, some specimens measuring nearly a meter in diameter.

The Silverbell-tree of these mountains is a species of the southern Alleghenies, having previously been known west of the Mississippi river at only one other station in the Boston Mountains. It is found in considerable abundance in some of the coves, and more rarely on the adjacent slopes and ledges. As it grows here it is usually a shrub three to five meters in height, but rarely it attains the size of a small tree. The largest specimen observed was perhaps seven or eight meters tall, and with a trunk two decimeters in diameter. The bark, except on the oldest specimens, is of a reddish-gray or chestnut color, variegated with pale streaks and lenticles, and somewhat resembling that of the Striped Maple. The flowers open while still quite immature and green, a peculiarity that has been noted in *Halesia carolina* L. by Dr. R. M. Harper. Before falling they are more than double in size, the corollas becoming two centimeters or more in diameter, and of a pale cream color slightly flushed with pink.

Through lack of time and the necessity of limiting the impedimenta on these hard climbs, very few of the herbaceous plants were collected, and no general list was made. This part of the vegetation, however, is very luxuriant in the north facing coves, perhaps even more remarkable than the woody plants, and certainly with more northern species, uncommon in this part of the country. In the richer spots there are great beds of the Maidenhair-fern, Beech-fern and Christmas-fern, besides more rarely the Fragile Fern, Rattlesnake-fern and others. Bloodroot, Dutchman's-breeches, Wild Ginger, Wake-robin, Bellwort, March-lily (*Erythronium americanum*), Spider-wort and Violets, yellow and blue, are amongst the common spring flowers. Here also, as the season advances, are found the blue Cohosh, Black Snakeroot and White-fruited Actea, and scores of other plants of similar association. But we must hasten on, as it is still some distance to the top of the mountain.

A little farther up we begin to encounter, on the rich open slopes, the little Buckeye (*Aesculus glabra* var. *monticola*), which we may find even more abundant on top of the mountain. Many of the plants here are not more than half a meter in height, and the large cymes of creamy-yellow flowers in spring, and the heavy clusters of fruit in autumn, sometimes bear down the slender branches. The pretty little yellow-flowered Honeysuckle (*Lonicera flava*) and the Wild Yam (*Dioscorea villosa*) are

frequently found in similar situations, and a southern Gooseberry (*Ribes curvatum*) grows sparingly along rocky ledges.

As we approach the top the trees begin to diminish in size; the woods become more open and the herbaceous growth is sparser. Upon attaining the summit we find ourselves on a strip of comparatively level rocky ground, which may be followed for several miles east or west, but which often is not more than a hundred yards in width, and sometimes narrowing to a sharp rocky ridge or widening to several times its average breadth. Much of the surface is strewn with sandstone rubble and boulders of disintegration. On the more level portions there is sometimes a considerable accumulation of sandy soil, and small areas might even be tillable. Over most of this portion there is a growth of small timber, White Oak being the commonest, and in spots almost the only species. The trees are small, seldom more than eight or ten meters tall, and with gnarled and twisted trunks and branches, evidence of their struggle with the strong winds that at most seasons sweep across these heights. Other species of less common occurrence are the Blackjack, Black and Post Oaks, Mocker-nut and Arkansas Hickories, Chinquapin (*Castanea ozarkensis*), Sassafras, White Ash, Big-tree Plum (*Prunus mexicana*), Flowering Dogwood, Persimmon and a few others. Towards the east end of the mountain, in Arkansas, the Cucumber-tree is sometimes found in this summit forest, and the Chinquapin is more abundant. In the more rocky portions the trees give place to copse or thicket growth, in which shrubs and several of the arborescent species mentioned above, but attaining only the size of low shrubs, abound. Here are found several species of Plum and Haw bushes, Wafer Ash, Fringe-tree or Old man's beard (*Chionanthus virginica*), Witch-hazel, Blackberries, Buckeye (*Aesculus glabra* var. *monticola*), Copal Sumac and Carolina Ilex. Occasionally there is a stunted Pine or Cedar bush, and about rocky ledges grow the Juneberry (*Amelanchier canadensis*), Gum-elastic (*Bumelia lanuginosa*) and two shrubby species of St. John's-wort (*Hypericum prolificum* and *H. oklahomense*). The latter is much the commoner, and is very abundant in some spots. The bushes sometimes reach a height of two meters, with stout spreading branches. Some of the stems near the base are more than two centimeters in diameter, with shredded or thinly exfoliating bark. Prairie openings and glades, similar to those mentioned as occurring on Blackfork Mountain, occupy small areas in the more sterile portions, especially towards the south side. The grasses and small flowering plants of these open spaces belong for the most part to common and widely distributed species, characteristic of the adjacent western prairies.

At an early season a very distinct contrast is noticeable in the vernal response of the vegetation in the valley and at the top of the mountains. This is quite out of proportion to the difference in altitude, which generally is less than 1600 feet (about 500 meters). There is also a distinctly slower development of verdure on the south than on the north side, towards the

top of the mountain, while the contrary is true at the lower levels. This is doubtless to be accounted for by the strong, and at this season cold, south winds that prevail at the higher level on the windward side, and conversely to the protection afforded against them by the position of the valley, and by its somewhat higher humidity. This contrast in the relative advancement of vegetation at the different levels was most noticeable when an ascent of the mountain was made from Page, on April 12th, 1922, the season being a rather backward one. At this time nearly all trees and shrubs in the valley were in full leaf; Oaks and Hickories were dropping their staminate flowers; all of the Vacciniums, Black Haw and most species of Crataegus were in bloom; while such early things as Plums, Redbud, Sassafras and Juneberry were past flowering. Half way up the north side of Rich Mountain the Oak and Hickory leaves were less than half grown; Linden and Sweet Gum were just beginning to leaf out, Dogwoods and Silverbell-trees were blooming in the coves. A little farther up the small green flowers of the last named tree were just appearing; and the little Buckeye and Pink Azalea were in full bloom. On top of the mountain, Buckeye, Sassafras, Juneberry and Plums were in bud or just beginning to bloom, while many of the other shrubs and trees were still quite dormant.

During rainy seasons, especially in the autumn, fogs often prevail on the mountain top or sometimes settle in the valleys, while at the same time the sun may be shining on the lower or higher levels. At such times vegetation becomes thoroughly saturated and drips with moisture although no rain may fall, and since one can see but a very short distance, to be caught on the rough mountain side, as happened on one of my trips, is to say the least not a pleasant experience. When the atmosphere is clear wonderful views of the surrounding country may be had from some of the highest points on Rich Mountain, particularly towards the south where there is little timber on the summit to obstruct the outlook. Range upon range of wooded mountains are in sight, with occasional small valleys intervening, in which clearings and settlements stand out in sharp contrast, and beyond, the blue outlines of the hills merge into each other until lost on the far horizon. Some attempts at settlement have been made on the mountain top, especially towards the eastern end. A small tourist hotel was built above the station of Rich Mountain, Arkansas, several years ago, but it is not now in operation, and is in a state of dilapidation. There are also a few other, mostly abandoned, buildings in the same vicinity, and an occasional woodman's cabin may be found elsewhere. But so well has nature held her own here that in most parts one may tramp all day without meeting a soul, seeing any stock or encountering any other sign of human occupancy.

The following list of woody plants is compiled from collections made on several trips at different seasons from Page, Oklahoma, and one in the autumn of 1923 from Rich Mountain Station, Arkansas.

PINACEAE

Pinus echinata Mill. Growing in mixed stands with Oaks, Hickories and other broad leaved trees in the valley and on the south slopes of the mountains. It is most abundant on the south side of Blackfork Mountain, where it extends to the top and in many places constitutes the major part of the forest. After being cut for several years to supply the saw mills in the valley this species is still conspicuous, and in inaccessible places some fine specimens remain.

Juniperus virginiana L. Found occasionally at all levels from the valley to the mountain tops, but nowhere very abundant or of large size.

LILIACEAE

Yucca glauca Nutt. This low species, with only a woody base, is found sparingly in the rocky valley of Big Creek, but is more abundant in open situations on the south slopes of the mountains.

Smilax Bona-nox L. This is the common Sawbriar of the region, and is particularly abundant in the thickets in the rocky valley, where it is a great hindrance to the pedestrian.

Smilax hispida Muhl. In thickets and low ground in the valley and on the lower mountain slopes.

Smilax rotundifolia L. This southern species was noted only in the valley where it seeks the richest and dampest locations.

Smilax glauca Walt. Uncommon in thickets and open ground both in the valley and on top of the mountains.

SALICACEAE

Populus balsamifera var. *virginiana* (Castigl.) Sarg. A few trees were noted along Big Creek in the lower part of the valley, but it is uncommon here and not found above Page.

Salix longipes var. *Wardii* (Bebb) Schneider. This Willow is abundant in the valley, growing along the margins or amongst the rocks in the shallow channel of Big Creek, where it is a shrub seldom more than two meters in height. It is rarely found about pools in the channels of the small streams on the north side of Rich Mountain.

Salix nigra Marsh. A few small specimens were seen in the valley near Page, but it is quite rare and apparently absent above this point.

JUGLANDACEAE

Juglans nigra L. Rarely found in the valley, but often abundant and of large size in the coves and on rich slopes on the north side of the mountain.

Carya cordiformis (Wang.) K. Koch. Not infrequent along creek banks in the valley and on the north slopes of the mountain.

Carya cordiformis var. *latifolia* Sarg. Occasionally found with the type, and in similar situations.

Carya ovalis var. *obovalis* Sarg. This form is rare, if found at all in the valley, but is more abundant on the north slopes of the mountain.

Carya Buckleyi var. *arkansana* Sarg. This species is the commonest Hickory of the valley and lower mountain slopes, but is less abundant at higher levels.

Carya alba (L.) K. Koch. A common species both in the rocky valley and on both sides of the mountains, extending to the top, where it is not infrequent but of smaller size.

Carya alba var. *ficoides* Sarg. It is interesting to find this form, with its very distinct fruit, not infrequent on the north slopes of Rich Mountain. It was originally described from a single tree in Southwest Missouri, but since has turned up in several other widely scattered stations.

BETULACEAE

Betula nigra L. The River Birch grows sparingly along the margins of Big Creek.

Carpinus caroliniana Walt. This species is confined to the valley and lower slopes, and is most frequent along the rocky banks of the creek.

Ostrya virginiana (Mill.) K. Koch. A common small tree in the rocky valley, and more or less abundant on the slopes and top of the mountain.

Alnus rugosa (DuRoi) Spreng. A common shrub along the rocky banks and bed of Big Creek, and sometimes found along its small tributaries as they descend into the valley.

FAGACEAE

Castanea ozarkensis Ashe. The Chinquapin of the Ozark region, which has recently been described under this name, appears to be sufficiently distinct from the eastern and southern *Castanea pumila*, with which it has long been confused. However, there is much variability in the size and toothing of the leaves, as well as in their pubescence, and in the size and shape of the nuts, and I can see no justification for distinguishing in this region, as the author has done, a second species (*Castanea arkansana* Ashe) with densely prickly involucres. This species is not rare on both slopes and on top of the mountains. Here, as elsewhere, it grows usually as a large arborescent shrub, but occasionally as a tree with a single trunk and with a maximum height of eight or ten meters.

Castanea Margaretta Ashe. On top of Rich Mountain, above the station of the same name, in Arkansas, a Chinquapin was collected in fruit, having involucral spines sparse and remotely set, and appearing to agree generally with description of this species, to which it is rather doubtfully referred, as I know little of it.

Fagus grandifolia var. *caroliniana* (Loud.) Fernald & Rehder. A few trees of this Beech were found along the creek a short distance east of Page. It was not noted elsewhere on the mountain slopes in Oklahoma but is not rare in the vicinity of Mena, Arkansas.

Quercus alba L. The White Oak is a common tree throughout. Some magnificent specimens, with trunks a meter or more in diameter, and attaining a height of 25 or 30 meters, may still be seen in inaccessible places on the north slopes of Rich Mountain. On top of the mountain it is the most abundant arborescent species, but attaining only a small size. The variety *latiloba* Sarg. grows with the typical form.

Quercus stellata Wang. The Post Oak is very common in the rocky valley, and is found in open places on the slopes and abundantly on top of the mountains.

Quercus stellata var. *araneosa* Sarg. In sandy soil in the valley of Big Creek. Apparently rare.

Quercus stellata var. *Margaretta* (Ashe) Sarg. Found rarely in the valley near Page.

Quercus Muhlenbergii Engelm. The Chinquapin Oak is found rather sparingly both in the valley and on the slopes and tops of the mountains.

Quercus Phellos L. A few small specimens of the Willow Oak were found along Big Creek, near Page. Its presence here indicates its greater adaptibility than its congener, *Q. nigra*, both species being equally common in the lowlands of the larger streams of the vicinity.

Quercus borealis var. *maxima* Ashe. The northern Red Oak is of rather frequent occurrence on the steep rocky slopes on both sides of the mountains, but is apparently rare or absent in the valley and on the tableland of Rich Mountain.

Quercus Shumardii var. *Schneckii* (Britton) Sarg. This species is found both in the valley and on the north mountain slopes. In the latter situation it often becomes a fine large tree.

Quercus rubra L. This species—the Spanish Oak of the books—but usually called Red Oak in the South, is abundant in the valley but is not often found at the higher levels.

Quercus velutina Lam. The Black Oak is common both in the rocky valley and on the slopes and tops of the mountains.

Quercus velutina var. *missouriensis* Sarg. This rather well marked variety, with its less deeply cut and permanently pubescent leaves, is sometimes found here, growing with the typical form.

×*Quercus heterophylla* Michx. (*Q. borealis maxima* × *Phellos*). A hybrid apparently between these species was found in the valley near Page, and close to Big Creek. Both of the supposed parent species are growing in close proximity to it, and since *Q. Phellos* is rare, it is not surprising that it should have been cross pollinized by another species. From the narrow and variable character of the leaves it is evident that the Willow Oak is one parent, and the Red Oak is suggested by the texture and lack of pubescens in the foliage and by the character of buds and branchlets, as well as by its proximity. Although of adult size there was no fruit when the specimens were collected.

ULMACEAE

Ulmus americana L. Found in the valley and more rarely along ravines and ledges on the mountains, but nowhere common.

Ulmus fulva Michx. Comparatively rare on bluffs and steep slopes.

Ulmus alata Michx. This is the commonest elm of the area, and is found both in the valley and on the mountain tops and more rarely on the slopes.

Celtis laevigata Willd. Rarely found in the valley along Big Creek.

Celtis laevigata var. *texana* (Scheele) Sarg. A few specimens of this southwestern form were seen in the valley near Page.

Celtis pumila Pursh. This shrubby species is occasionally found on exposed slopes and ledges on the south side of the mountains.

Celtis pumila var. *georgiana* (Small) Sarg. This form, with pubescent leaves and branchlets, grows in similar situations to the last. It is here a slender straggling shrub, seldom more than one to two meters tall.

MORACEAE

Morus rubra L. The Mulberry is found sparingly in the rocky valley and on the lower slopes of the mountains. It was not noted on top, although it may perhaps occur there.

LORANTHACEAE

Phoradendron flavescens (Pursh) Nutt. Confined to the valley and lower slopes, where it grows on *Ulmus*, *Quercus*, *Nyssa* and perhaps other genera.

MENISPERMACEAE

Menispermum canadense L. Found in thickets in the valley and in coves on the north side of the mountain, but nowhere abundant.

Cocculus carolinus (L.) DC. Sometimes frequent in thickets in the valley.

MAGNOLIACEAE

Magnolia acuminata L. The Cucumber tree is found along the rocky banks of Big Creek in the upper part of the valley. On the Arkansas side, it extends to the top of Rich Mountain. Farther west, in Oklahoma, it is confined to the steep north slopes of the mountain, but there it is often abundant and of maximum size.

Magnolia tripetala L. The Umbrella tree was observed only towards the east end of Rich Mountain, in Arkansas, where it grows in coves and on rich north slopes. It is not improbable that it may occur somewhere on the Oklahoma side of the line, although we have no record of it. Specimens distributed under this name by G. W. Stevens, from Page, Oklahoma, which I have examined in several herbaria, are all of the preceding species.

ANONACEAE

Asimina triloba (L.) Dunal. The Papaw is found occasionally in the valley and more abundantly in the north facing coves of the mountain side.

LAURACEAE

Sassafras officinale Nees & Eberm. This is an abundant shrub or small tree in the valley, and is even more frequent on the table land at the top of Rich Mountain.

Benzoin aestivale (L.) Nees. The Spicebush grows as an undershrub in the rich woods of the valley, and extends to the top of the mountain, but it is most abundant in coves on the north slopes.

SAXIFRAGACEAE

Hydrangea arborescens L. This shrub is found on cool shaded banks at all levels, but is most abundant along the rocky ravines and in the rich coves on the north side of Rich Mountain.

Philadelphus pubescens Loisel. This handsome shrub grows only along rocky ravines and benches well up on the north slopes of the mountain, but in such situations it is often abundant.

Philadelphus pubescens var. *intectus* (Beadle) Rehd. This variety, distinguished by its glabrous or only slightly pubescent leaves, is found here with the typical form, but is less abundant.

Ribes Cynosbati L. This prickly-fruited northern Gooseberry is also confined to the higher slopes on the north side of the mountain. It is sometimes found on rocky ledges, but is most frequent on the great rubble heaps or rock slides that form such a curious feature of the mountain side.

Ribes curvatum Small. This low southern species grows sparingly along ledges near the top of Rich Mountain.

HAMAMELIDACEAE

Hamamelis macrophylla Pursh. This southern Witchhazel grows both in the valley and on the north slopes and top of Rich Mountain. In protected situations, especially at the lower altitude, it becomes a large shrub, sometimes four or five meters tall and with stems fully a decimeter in diameter. Higher up it often grows in great patches, most of the plants being under half a meter in height.

Hamamelis vernalis Sarg. The spring blooming species of the Ozarks is found along the rocky banks and bed of Big Creek.

Liquidambar Styraciflua L. The Sweet Gum is a common forest tree in the valley. It also grows on the north slopes, where it attains a very large size.

PLATANACEAE

Platanus occidentalis L. Only a few specimens of the Sycamore were seen along Big Creek, in the lower part of the valley.

Platanus occidentalis var. *glabrata* (Fernald) Sarg. This variety, with the leaves early glabrate and with its lobes entire, was collected on the rocky banks of Big Creek a short distance below Page.

ROSACEAE

Amelanchier canadensis L. The Juneberry is found on open rocky ledges from the valley to the top of the mountain. It is usually shrubby, seldom exceeding two or three meters in height.

Crataegus Bushii Sarg. A small tree occasionally found in thickets and open woods in the valley.

Crataegus bracteata Sarg. This species, of the Pruinosae group, was collected and observed in several places on top of Rich Mountain.

Crataegus spathulata Michx. This southern Red Haw is frequent in the rocky valley and on the south slopes of Blackfork Mountain. It is of small size here, rarely exceeding two or three meters in height.

Crataegus apiifolia Michx. The Parsley-leaved Haw, also a southern species of the Microcarpae group, grows in similar situations to the last. It is even more abundant than its congener on the open rocky slopes of the mountains, where it is usually a low bush not more than a meter or two in height.

Crataegus pagensis Sarg. The type locality for this shrubby species is, as the name indicates, near Page. It is rather abundant in the rocky valley and on the lower slopes on the south side of Blackfork Mountain. It is a very spiny intricately branched shrub, from one to two meters in height. The flowers are large and handsome.

Crataegus straminea Beadle. This species grows in similar situations to the last and is about as common. Although of similar habit and belonging to the same group, the two are quite distinct in character of fruit, flowers and leaves.

There are perhaps two or three other species of Crataegus growing here, although the genus is not abundantly represented.

Prunus serotina Ehrh. The wild cherry is not uncommon both in the valley and on the mountain sides.

Prunus Munsoniana Wight & Hedrick. Occasionally found in thickets in the valley and on top of the mountain.

Prunus lanata (Sudworth) Mackenzie & Bush. A small tree plum of the American group, with pubescent leaves, has been referred to this species, although it is probably distinct from the type described from western Missouri. Frequent in thickets in the valley and in open ground on top of Rich Mountain.

Prunus mexicana Wats. This is here a small tree growing in similar situations to the last species, which it somewhat resembles. The leaves, however, of this southwestern species are generally larger and more rugosely veined than in any other American plum.

Rubus occidentalis L. The wild Raspberry grows in thickets and on rocky ledges on the north side of the mountain.

Rubus flagillaris var. *invisus* Bailey. This Dewberry is common in rocky ground, both in the valley and on the mountain slopes.

Rubus frondosus Bigel. Found in thickets in the valley and on the north side of the mountain.

Rubus Andrewsianus Blanchard. This Blackberry, with upright or slightly arched stout canes, is very abundant in thickets in the valley and on the tableland at the top of Rich Mountain.

There is evidence of at least two other species of Rubus in this locality, one of them resembling *Rubus canadensis* L , and perhaps referable to that species, but with the incomplete material available I am unable to identify them definitely.

Rosa setigera var. *tomentosa* Torr. & Gray. Found in thickets and open places in the valley, but not common.

Rosa subserrulata Rydb. This little Rose is common throughout much of the Ozark region. In this locality it is sometimes found in the valley, but is much more common on the rocky mountain sides and on top, where it sometimes grows in patches covering many square meters. The plants are usually low, often not more than two or three decimeters in height, although in protected situations they are sometimes nearly a meter tall. With its hispid prickly stems, sharply serrate leaves and somewhat glandular foliage and inflorescence, it is an easily recognizable and well marked species.

LEGUMINOSAE

Gleditsia triacanthos L. The Honey-locust is sometimes found in the valley, but it is not common.

Cercis canadensis L. The Redbud is a common small tree found in the valley and on top of the mountains, and less frequently in open places on the rocky slopes.

Robinia Pseudoacacia L. The Black Locust is a common species on the rocky slopes of the mountains on both sides of the valley, and it sometimes descends to the rocky creek banks. It is undoubtedly native on these mountains and through much of the southern Ozark region.

Amorpha fruticosa L. This shrub was noted only along the margins of Big Creek and its tributaries in the valley.

Amorpha tennessensis Shuttlw. This species, which closely resembles the last, grows in similar situations.

Amorpha glabra Desf. Sometimes found in the rocky valley, but much more common in glades and open rocky places on the south slopes of Blackfork Mountain. It is a tree-like shrub, sometimes more than two meters tall.

RUTACEAE

Ptelea trifoliata L. Found in rocky thickets in the valley, but most abundant on the mountain tops.

ANACARDIACEAE

Rhus canadensis Marsh. The Aromatic Sumac is found in thickets and open rocky ground from the valley to the summits of the mountains.

Rhus trilobata Nutt. This taller and much stouter species grows in thickets and on rocky ledges. It is most abundant on the tableland at the mountain top.

Rhus Toxicodendron L. The Poison Ivy is a common shrub or climber in thickets and open woods at all levels. There are evidently two, and perhaps three, forms or varieties, which have not been distinguished, growing here. There is marked variation in the size, lobing and pubescens of the leaves, in the upright or scandent habit, and in the time of flowering.

Rhus glabra L. The Smooth Sumac is found in thickets both in the valley and at the top of the mountains.

Rhus copallina L. This species grows in similar situations to the last, and is more common.

AQUIFOLIACEAE

Ilex opaca Ait. The evergreen Holly is found only in the valley, where it grows in sandy bogs or along the creek banks.

Ilex caroliniana (Walt.) Trel. This southern species grows abundantly along the rocky ravines on the north slopes of Rich Mountain. It is also common, but of small size, in thickets at the top of the mountain.

Ilex decidua Walt. This deciduous species is common in thickets and woods, especially in the valley, but is also found in the mountain top. It sometimes becomes a small tree 5 or 6 meters tall.

CELASTRACEAE

Evonymus americanus L. This pretty little shrub is found occasionally in sandy bogs and on moist banks at the lower levels.

Evonymus atropurpureus Jacq. The Wahoo grows in thickets and open woods, being most abundant in the valley, but sometimes found at the mountain top.

STAPHYLACEAE

Staphylea trifolia L. The Staff-tree is common in the rich coves and on fertile slopes on the north side of the mountain.

ACERACEAE

Acer saccharum Marsh. The typical Sugar Maple is found occasionally in woods in the valley.

Acer saccharum var. *glaucum* Sarg. This is the common Sugar Maple of the Ozark region, and it grows abundantly and of large size, here in the valley and on the north slopes of the mountain.

Acer saccharinum L. The Silver Maple is rather rare, and found only along the margins of Big Creek.

Acer rubrum L. The Red Maple is a common tree of the valley and also frequent on rocky ledges and slopes on both sides of the mountains.

Acer rubrum var. *tridens* Wood. This variety is found in the valley and on ledges on the north mountain slopes.

Acer Negundo L. The Box Elder grows along the rocky margins of Big Creek, and is more rarely seen at higher levels.

HIPPOCASTANACEAE

Aesculus glabra var. *monticola* Sarg. This recently described Buckeye was found here only at the higher levels on the north side of Rich Mountain, and on the tableland at the summit. It is a slender branching shrub, from 0.5 to 1.5 meters tall, and often grows gregariously. It is very conspicuous in bloom on account of the large size of the flower spike in proportion to the whole plant. Its small fruit, low shrubby habit and peculiar foliage make it very distinct from all other related forms.

TILIACEAE

Tilia floridana Small. This fine southern Linden grows in sandy woods in the valley, and more abundantly on the north slopes of the mountain. In the latter situation it often becomes a tree 20 to 25 meters tall, and with a trunk diameter of a meter or more. It is also rarely found on top of the mountain, where it is of small size.

Tilia floridana var. *hypoleuca* Sarg. This form, with leaves pale or silvery beneath, from a white powdery coating, is frequent on the mountain side.

RHAMNACEAE

Rhamnus caroliniana Walt. This rather attractive little tree, known as Indian Cherry, is found sparingly in thickets along the creek.

Ceanothus americanus L. Grows in rocky ground in the valley and in open woods on the south slopes of the mountains. Not very abundant.

Ceanothus ovatus Desf. This species is apparently rather rare. It grows in similar situations to the last.

Berchemia scandens (Hill) Trel. This stout woody twiner is very common in thickets in the valley, and sometimes also grows in glades on the mountain sides and on the summit. It is popularly called Supplejack in some sections, but in the Southwest it is usually known as Rattan vine.

VITACEAE

Vitis rotundifolia Michx. The Muscadine is very common in thickets in the valley and along rocky creek banks. It is also sometimes found at higher levels. It usually spreads over low bushes or climbs on small trees, but never to a height of more than a few meters. The fruit is large and sweet, and is quite agreeable when ripe, in late autumn.

Vitis cinerea Engelm. This winter grape is found in the valley, growing in thickets along the creek, and also in open situations on the north side of the mountain.

Vitis cordifolia Michx. Occasionally found in the valley, where it is a high climber in trees, and more abundantly about the margins of rock slides, on the north slopes of the mountain. In the latter situations it is usually prostrate upon the rocks.

Vitis Linsecomii var. *glauca* Munson. This Southwestern species grows on rocky banks and in dry open woods on the mountain slopes. It can easily be recognized by its large firm leaves, purple-glaucous branchlets and depressed-globose berries, about a centimeter in diameter.

Parthenocissus quinquefolia var. *hirsuta* Planch. This pubescent form of the Virginia Creeper is frequent in the valley and occasionally found at higher levels. It is a stout climber on trees and sometimes on rocky bluffs.

THYMELAEACEAE

Dirca palustris L. This curious northern shrub, commonly known as Leatherwood, from its tough supple branches, was found along a little north-facing bluff of Big Creek.

GUTTIFERAE

Ascyrum stans Michx. This slender shrub is found rarely in sandy boggy ground and on moist banks in the valley.

Ascyrum hypericoides L. The little St. Andrew's-cross grows abundantly in dry rocky ground, especially on the south slopes.

Hypericum prolificum L. This tall shrubby species of St. John's-wort is quite common in places along the rocky margins of Big Creek, and is also abundant in open ground on top of the mountains.

Hypericum oklahomense, sp. nov.[1]

Stems erect or spreading, diffusely branched above, the young branchlets slightly ancipital, leaves narrowly lanceolate or obovate, principal ones 5 to 10 mm. wide, 4 to 6 cm. long, abruptly pointed at apex, gradually tapering into a petiole-like base, distinctly finely punctate on the upper surface, of firm texture, with revolute margins, often with conspicuous fascicles of small leaves at their bases; bracts of inflorescence ovate or short oblong, broad-based; capsules narrowly ovoid or subulate, 12 to 15 mm. long, including the beak, which is often fully half as long as the body, 2 to 3.5

[1] Hypericum oklahomense, sp. nov.

Frutex erectus, 0.5–2 m. altus, interdum minor, ramis subteretibus cinereo-brunneis ramulisque ancipitibus; folia ramulorum anguste obovata vel lanceolata, abrupte acuta, basin versus sensim attenuata, superne punctata, margine involuta, 4–6 cm. longa, 5–10 mm. lata, saepe foliis fasciculatis multo minoribus in axillis; cyma terminalis composite dichotoma, subfoliosa, sparsiflora; capsula anguste ovoidea vel cylindrica, 3-locularis et manifeste 3-lobata, rostro incluso 12–15 mm. longa, 2–3.5 mm. lata, in rostrum longum attenuata; flores ignoti.

mm. thick, 5-celled and deeply 5-lobed, with sharp ridges and sutures, rarely 4-celled or less; inflorescence scattered at the ends of the branches; flowers not seen.

A shrub often less than 5 decimeters in height on dry rocky slopes, but in the protection of rocky ledges becoming nearly or quite 2 meters tall, with thin, freely exfoliating brownish-gray bark. This species appears to be most closely related to *Hypericum lobocarpum* Gattinger, of central Tennessee, but differs from it markedly in its firmer, narrower leaves, with more conspicuous fascicles of smaller ones in their axils, in its more scattered inflorescence and in the more slender sharply lobed capsules. The habitat also is quite different, *Hypericum lobocarpum* growing in dense swamps, according to the description. In appearance our plant more closely resembles *Hypericum densiflorum* Pursh.

CACTACEAE

Opuntia humifusa Raf. This low growing species of Prickly Pear is found locally in rocky glades on the slopes and top of the mountain.

NYSSACEAE

Nyssa sylvatica Marsh. The Black Gum is an abundant forest tree both in the valley and on the slopes and tops of the mountains. It attains its largest size on the north side of Rich Mountain, where there are many fine specimens.

ARALIACEAE

Aralia spinosa L. This small spiny tree grows in the coves and on rich slopes on the north side of the mountain. It is not common.

CORNACEAE

Cornus florida L. The Flowering Dogwood is a common small tree in the valley and on top of the mountains. It is found also in open woods on the mountain sides.

Cornus obliqua Raf. This western form of the Silky Dogwood or Kinnikinnik is very common along the margins and in the rocky bed of Big Creek and its tributaries in the valley. It is also found along the ravines and mountain torrents on the north side of Rich Mountain.

ERICACEAE

Rhododendron roseum Rehd. This beautiful Azalea, known in this vicinity and generally in the Southwest as wild Honeysuckle, is found in the valley and on the rocky slopes of Rich Mountain, where it is often very abundant.

Rhododendron oblongifolium (Small) Millais. Found only along the rocky banks of Big Creek and in moist rocky ground in the valley. It

blooms nearly a month later than the last species, and after the leaves are nearly grown. The flowers are pale pink in the bud, but soon fade to white, and are much smaller than in *R. roseum*.

Vaccinium arboreum Marsh. The Tree Huckleberry, so-called, is usually only a shrub in size here. It is abundant in the more open rocky parts of the valley and on top of the mountains, but is most common on dry rocky slopes and in glades on the south slopes, where plants less than half a meter in height were noted in fruit.

Vaccinium arboreum var. *glaucescens* (Greene) Sarg. The form with leaves pale and glaucous beneath is found with the type, but is less abundant.

Vaccinium stamineum L. This shrub, which grows to a height of from five decimeters to a meter, is very common in rocky ground, especially on the south slopes of Blackfork Mountain. It is also sometimes found in the valley and on top of the mountains.

Vaccinium vacillans var. *crinitum* Fernald. This is the common low Huckleberry of the Ozark region, and is one of the most abundant shrubs in rocky ground in the valley, on the south slopes and on the mountain tops. In the glades and rocky openings, where it covers many acres, it seldom exceeds 3 or 4 decimeters in height. The fruit is abundant and is often gathered by the country people. The name Blueberry, by which it is known in the Eastern States, is not recognized here.

Xolisma ligustrina (L.) Britton. This shrub is confined to wet rocky and sandy places in the valley, in close proximity to the streams.

SAPOTACEAE

Bumelia lanuginosa (Michx.) Pers. This small southwestern tree is not rare in open rocky ground in the valley and on top of the mountains. It also occurs in glades and on dry rocky slopes on the south side of the mountains. In the Southwest it is generally known as Gum-elastic, and in this section it is sometimes called Chittim-wood.

EBENACEAE

Diospyros virginiana L. The Persimmon is not uncommon in rocky ground in the valley and on the tableland at the top of the mountains.

Diospyros virginiana var. *platycarpa* Sarg. This variety, with its larger, earlier ripening fruit and pubescent leaves, is commoner than the typical form here, as throughout most of the Ozark region.

STYRACEAE

Halesia monticola var. *vestita* Sarg. A few small specimens of the Silverbell-tree were seen in the valley along the rocky creek banks, but it is abundant far up on the north slopes of Rich Mountain and in the rich coves.

OLEACEAE

Fraxinus americana L. The White Ash is rather abundant in the valley and on the north slopes of the mountains. In the latter situation it attains its largest size. It probably also occurs less frequently at all levels.

Chionanthus virginica L. This attractive shrub or small tree, known throughout this region locally as Old Man's Beard, from its abundant fringe-like white flowers appearing in early spring, is common in the rocky valley, and is sometimes also found on top of Rich Mountain.

VERBENACEAE

Callicarpa americana L. This shrub, sometimes called French Mulberry, grows in the valley, and is usually found in rocky ground along the margins of the creek. It is very conspicuous and ornamental in the autumn on account of its large axillary clusters of purplish-red fruit.

RUBIACEAE

Cephalanthus occidentalis L. The Button-bush, or as it is called in this section, the Button Willow, is found rarely along the margins of Big Creek

CAPRIFOLIACEAE

Viburnum rufidulum Raf. This southern species of Black Haw grows rather sparingly in thickets and open woods in the valley and on top of the mountains. It sometimes becomes a small tree 5 or 6 meters in height.

Symphoricarpos orbiculatus Moench. This little shrub, known throughout this section as Buck-brush, is found in thickets and open rocky ground in the valley and on the mountain tops, but it is not common.

Since the area we are considering embraces only a single mountain valley, a few miles in length, and its enclosing ridges, the flora is naturally not a representative one for the entire sub-region, but only of certain phases of it. The most noticeable deficiencies in the list of trees and shrubs given above are the distinctly lowland and aquatic species, such as the Bald Cypress, Swamp Hickory, Water Oak, Bur Oak, Overcup Oak, Planer-tree, Cedar Elm (*Ulmus crassifolia*), Swamp Honey-locust, Pecan, Small Cain, Green Haw, (*Crataegus viridis*), White-wood (*Forestiera acuminata*) and Green Ash, all of which are abundant in the alluvial flood plains and swamps of the Arkansas River, fifty or sixty miles to the north, and most of them found much nearer, along small streams, including the Ouachita, and branches of the Poteau and Little River, all having their sources in these highlands. To anyone familiar with the flora of the more typical portions of the Ozark region, and especially the plateau section, the comparative paucity of the prairie flora in the glades and openings, or at least the absence of the peculiar isolated relic colonies and species so abundant northward, will be apparent. This is the more obvious on

account of the proximity of this area to the western prairies and closer geographical connection with the Southwest.

These deficiencies are, however, more than compensated by the presence here of many northern and eastern species. And it is to this element that the flora owes its peculiar interest. Amongst this class the following species may be mentioned:

Magnolia acuminata	*Robinia Pseudoacacia*
Magnolia tripetala	*Lonicera flava*
Ribes Cynosbati	*Dirca palustris*
Philadelphus pubescens	*Rhododendron roseum*
Amorpha glabra	*Halesia monticola* var. *vestita*

and of less significance such widely distributed species as *Quercus borealis* var. *maxima*, *Menispermum canadense*, *Hydrangea arborescens* and *Staphylea trifoliata*, all of which are near the southwestern limits of their range here. This list of trees and shrubs, although not a very long one, nevertheless, constitutes about ten per cent of the total, and if to them were added the herbaceous species, which are perhaps relatively more numerous, it could be made much more impressive. Most of these plants are not unknown northward in the Boston Mountains and some of them even in the deep valleys and canyons along the southern margin of the Ozark plateau, but they occur there only in a few peculiar and isolated spots, and these become rarer and more widely separated as we advance northward.

Magnolia acuminata is found along the margins of the old Mississippi Embayment, in southeastern Missouri and southern Illinois. It also turns up at a number of scattered localities in the Boston Mountains of northern Arkansas and we have records of it as far northwest as Eureka Springs, and along tributaries of the White River, in Barry County, Missouri. *Magnolia tripetala* is much rarer and more restricted in this region. Besides the station mentioned here, on the north side of Rich Mountain, I have seen it only in swampy lowlands in Hot Springs County, Arkansas. It has been reported a number of times from other parts of the Ozark region, and of course may rarely occur elsewhere, but most of these reports seem to have been based on wrong determinations of *Magnolia acuminata*, and in one instance at least I have seen leaves of *Asimina triloba* masquerading under this label. *Ribes Cynosbati* is also found in southeastern Missouri, and on high, north-facing bluffs of Current River in Shannon County, Missouri, and of James River in Stone County. In Arkansas, besides the locality described here, I have collected it on Magazine Mountain, in Logan County, where it is abundant on the north bluffs. *Philadelphus pubescens* has a more southern range, although growing in similar situations, usually in sandstone areas. The most northern stations at which I have seen it in the Ozark region are along Buffalo River, a tributary of White River, in Marion County, Arkansas, and at Jasper, Newton County, in the same state. *Amorpha glabra* appears to be one of the most restricted species in this region. The only other place at which I have seen it is on Magazine

Mountain, Arkansas. It may be expected to occur on some of the other higher mountains.

Robinia Pseudoacacia is much more abundant and widely distributed. It was commonly planted as an ornamental and shade tree about dwellings in the early history of the western lands settled by people from its center of distribution, and since it, like them, was of hardy and prolific stock, it took readily to the country and became widely naturalized. It has been said that the early Kentucky pioneer, when he started to seek a new home in the west, filled one pocket with buck shot and the other with seeds of the Black Locust; and wherever he settled it soon appeared. As to the other commodity, it may, like the dragon teeth of the fable, have gone out as allies to the hunters and woodsmen, aiding them to conquer the country which their descendants still dominate. However, to get back to our subject, this tree grows so abundantly on these mountains, in situations so remote from settlements, and where the flora is so uncontaminated, that there can be no doubt of its being indigenous here, and over a large part of the southern Ozark region.

Lonicera flava is also found rather frequently in the rougher parts of the Ozarks. But it evidently belongs in this association, ranging, as it does, from the mountains of North Carolina, through Tennessee and Kentucky. *Dirca palustris* is the most northern in its general distribution of any of the woody species found here. It grows from New Brunswick to Virginia, and through the Central States, although generally rare west of the Mississippi River. It is known in southeastern Missouri, and at a few isolated stations as far west as the James River in Stone County. Near Eureka Springs, in northwestern Arkansas, it is sufficiently abundant to have given the name Leatherwood Creek to a small stream. And it has been found some distance west of the Rich Mountain station, near Muskogee, Oklahoma. *Rhododendron roseum* has a similar range eastward, but has been found in Missouri only in the St. Francois Mountain section of the southeastern part of the state. It also occurs at one or two localities in southwestern Illinois.

Halesia monticola var. *vestita* is perhaps the most interesting, as it is the most restricted of the eastern woody species found in the Rich Mountain area. It is rather closely allied to *Halesia carolina*, which is found from Virginia and Florida to Kentucky and southern Illinois. The species found here has a similar though more restricted range, and is distinctly a tree of the mountains. It has previously been found at only one other locality west of the Mississippi River: along the Little Red River, in Cleburn County, Arkansas. It may be expected, however, to turn up in intervening stations.

It will be noted that the forest flora of this area is made up for the most part of species common in the Coastal plain to the south, as is the case over the entire Ozark region. The presence in these isolated and protected situations of a number of species having their center of distri-

bution along the Atlantic coast and in the southern Appalachians constitutes a notable extension westward of that flora and indicates its former wide migration westward and southward. The comparative paucity of species in the prairie openings and glades, or at least the absence of colonies of peculiar xerophytic plants of the western and southwestern plains, which constitutes so conspicuous a feature of the typical Ozark region to the north, would seem to indicate that this western plains flora, which under arid conditions unquestionably prevailed over much of the plateau section before the advance of the present forest, did not extend south of the Arkansas River, nor continuously at least, into the more rugged Boston Mountain area.

Any adequate discussion, however, of these questions would involve a more detailed study of the entire flora, and especially of the herbaceous plants of the glades and barrens, which is beyond our present purpose. It is proposed in a subsequent paper to give an account of some other interesting localities in this part of the region, and to see what light they throw on the history of the Ozark forests.

FORSYTHIA VIRIDISSIMA VAR. KOREANA

ALFRED REHDER

Forsythia viridissima var. **koreana**, var. nov.

Forsythia suspensa Palibin in Act. Hort. Petrop. XVIII. 155 (Fl. Kor. II. 9) (1900), quoad specimina citata.—Nakai in Jour. Coll. Sci. Tokyo, XXXI. 89 (Fl. Kor. II.) (1911), quoad specimina citata.—Non Vahl.

Forsythia viridissima Nakai in Jour. Coll. Sci. Tokyo, XXXI. 89 (Fl. Kor. II.) (1911), quoad specimina citata; Fl. Sylv. Kor. X. 19, t. 2 (1921), excl. autor. plurimis citatis.—Non Lindley.

Frutex ramis patentibus arcuato-dependentibus; medulla continue lamellata sine diaphragmatibus. Folia indivisa, rarissime in turionibus vegetis trisecta, ovato-lanceolata vel oblongo-lanceolata, 5–12 cm. longa et 1.6–4.5 cm. lata, acuminata, basi late cuneata vel sensim attenuata, basi excepta vel tantum supra medium serrata vel serrulata, interdum integra vel fere integra, glaberrima, rarissime subtus pilis paucissimis instructa (in no. 10740 Wilsonii). Flores solitarii; pedicelli initio recurvi vel penduli, sub anthesi patentes, apice excepto dense bracteati, sepala ovalia vel ovali-oblonga, tubo corollae manifeste breviora interdum dimidium tubum tantum aequantia; corolla 1.8–2.5 cm. longa. Fructus non visi, secundum cl. Nakai ovato-attenuata, 1.5–2 cm. longa et 7–10 mm. lata, verrucosa, valvis medio impressis.

KOREA. Prov. Keiki, near Keijyo "in Seoul frequens," *U. Faurie*, no. 201, May 1901; Poukhan-san, side of a spring, probably planted, *E. H. Wilson*, no. 10740, September 24, 1918. Prov. South Heinan, Chinnampo, *J. G. Jack*, September 17, 1905. Prov. South

Keisho, Chirisan, common by roadsides and stream-sides, alt. 600–1845 m., *E. H. Wilson*, no. 9607, November 14, 1917.

CULTIVATED. Korea: Keiyjo, Chosen Hotel, *E. H. Wilson*, no. 11241 Jan. 6, 1919 (flowers forced in the house). Arnold Arboretum: December 24, 1919 (seedlings), October 14, 1920 and (forced flowers) February 12, 1924 (plants raised from seed received from the Forest Department of Korea in 1919); April and September 1917 (plants received from Yokohama Nursery Company in 1915 as *Forsythia* spec. from Korea).

From typical *F. viridissima* Lindley of which there are specimens from Kiangsu, Chekiang and Fokien in this herbarium besides those from cultivated plants, the variety differs chiefly in the more spreadnig habit, larger and brighter colored flowers, longer and narrower sepals and in the more closely and finely serrate generally ovate-oblong or ovate lanceolate leaves, broadest about or below the middle and often broad-cuneate at the base. In typical *F. viridissima* the leaves are generally narrow and of an oblong-obovate or oblanceolate type, being broadest above or about the middle and narrow-cuneate at base, the serration is coarser, usually confined to the part above the middle and the leaves are more often entire, while on leaves of the more vigorous shoots of the variety the serration, which is coarser but with ascending mostly rounded teeth not flaring as in the type, extends to near the base; on very vigorous shoots occasionally, though apparently very rarely, trifid leaves are produced which I have never seen in typical *F. viridissima*.

From the hybrid *F. intermedia* Zabel (*F. suspensa* × *viridissima*) to which the variety bears some resemblance in habit and in the shape of its leaves, it is easily distinguished by the continuous lamellate pith, interrupted in the hybrid by solid diaphragms at the nodes and partly wanting in the internodes particularly of vigorous branches; in *F. suspensa* the internodes are quite hollow and the pith reduced to diaphragms at the nodes. The hybrid seems to occur also in Korean gardens, for there is a specimen before me collected by J. G. Jack in Seoul, September 22, 1905, from a cultivated plant, and a specimen collected by Dr. R. G. Mills, also at Seoul, on April 16, 1914, which both are referable to the hybrid, also specimens collected by E. H. Wilson (no. 6368) in the Tokyo Botanic Garden, on April 5 and July 12, 1914, from plants named *Forsythia viridissima* from Korea, belong here and so did part of the cuttings from these plants sent in 1915 by the Yokohama Nursery Company as *Forsythia* spec. from Korea, while at least one of these plants was the true *F. viridissima* var. *koreana*. As an ornamental plant the variety is to be referred to the typical form, as it is of better, less stiff habit and has more brightly colored flowers and possibly is hardier.

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ENUMERATION OF THE LIGNEOUS PLANTS OF NORTHERN CHINA, II[1]

ALFRED REHDER

LARDIZABALACEAE TO ROSACEAE

LARDIZABALACEAE

Decaisnea Fargesii Franchet in Jour. de Bot. VI. 234 (1892).—Rehder & Wilson in Sargent, Pl. Wilson. I. 343 (1913).

Decaisnea insignis Diels in Bot. Jahrb. XXIX. 342 (1900); XXXVI. beibl. LXXXII. 44 (1905).

SHENSI: Tai pei shan, alt. 2300–2600 m., *W. Purdom*, no. 501, 1910; "Mte. Kian san," *G. Giraldi*, August 4, 1897.—See also Diels, l. c., and Rehder & Wilson, l. c.

DISTRIBUTION: also Hupeh, Szechuan, Hunan (Pl. Sin. cur. Handel-Mazzetti, no. 103), Yunnan.

Akebia quinata Decaisne in Arch. Mus. Paris, I. 195, t. 13a (1839).—Hemsley in Jour. Linn. Soc. XXIII. 30 (1886).—Diels in Bot. Jahrb. XXIX. 344 (1900).—Gilg in Bot. Jahrb. XXXIV. beibl. LXXV. 28 (1904).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 124 (1919).—Hers in Jour. N. China Branch R. As. Soc. LIII. 106 (1922); Liste Ess. Lign. Honan, 2 (1922).

SHANTUNG: Lau shan, *O. Nebel* (ex Gilg, l. c.); Cape Ya tau, *A. Engler, B. Krug* (ex Loesener, l. c.).

NORTHERN KIANGSU: Liu lin shan, near Haichow, *J. Hers*, no. 602, May 5, 1921.

HONAN: without locality (ex Hers, l. c.).

SHENSI: Tsin ling shan, *P. J. Piasezki* (ex Hemsley, l. c., and Diels, l. c.).

DISTRIBUTION: also Hupeh, Kiangsi, Chekiang; Korea, Japan.

Akebia lobata Decaisne in Arch. Mus. Paris, I. 196, t. 13b (1839).—Diels in Bot. Jahrb. XXIX. 344 (1900).

HONAN: Yung ning, Tsi li ping, alt. 1100 m., *J. Hers*, no. 418, May 22, 1919, Teng feng, Yu tai shan, alt. 800 m., *J. Hers*, no. 278, June 17, 1919; without precise locality, *J. Hers*, no. 32, 1918.

SHANSI: Hia hsien, Huang hai kow, *J. Hers*, no. 1848, October 2, 1921.

SHENSI: several localities, *G. Giraldi* (ex Diels, l. c.).

DISTRIBUTION (of the type): Kiangsi, Hunan, Hupeh, Szechuan; Japan.

[1] For Part I, see Vol. IV, p. 117.

Akebia lobata var. **australis** Diels in Bot. Jahrb. XXIX. 344 (1900).—Bailey, Gent. Herb. I. 23 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 106 (1922); Liste Ess. Lign. Honan, 2 (1922).

HONAN: Yung ning, Tsi li ping, *J. Hers*, no. 418[bis], May 22, 1919; Chikung shan, *L. H. Bailey* (ex Bailey, l. c.).

DISTRIBUTION: also Hupeh, Kiangsi, Szechuan, Yunnan.

Though Hers' no. 418[bis] has entire leaflets like the variety, it may belong to the type; the leaves are too young to show the coriaceous texture characteristic of the variety.

BERBERIDACEAE

Nandina domestica Thunberg, Nov. Gen. Pl. I. 15 (1781); Fl. Jap. 9 (1784).—Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 78 (Enum. Pl. Chin., Bor. 4) (1833).—Hemsley in Jour. Linn. Soc. XXIII. 32 (1886).—Gilg in Bot. Jahrb. XXXIV. beibl. LXXV. 35 (1904).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 124 (1919).—Bailey, Gent. Herb. I. 23 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 112 (1922); Liste Ess. Lign. Honan, 19 (1922).

CHILI: Peking, cultivated (ex Bunge, l. c.); *E. Bretschneider* (ex Hemsley, l. c.).

SHANTUNG: Cape Ya tau, planted, *R. Zimmermann*, no. 462 (ex Gilg, l. c., and Loesener, l. c.).

HONAN: planted (ex Bailey, l. c., and Hers, l. c.).

DISTRIBUTION: also Chekiang, Kiangsi, Fokien, Hupeh; Japan.

In northern China this plant does not occur wild. In Peking it does not stand the climate and is grown in the house according to Bunge.

Berberis Soulieana Schneider in Bull. Herb. Boissier, sér. 2, v. 449 (1905); in Sargent, Pl. Wilson. I. 361 (1913); III. 437 (1917).—Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds Pl. Imp. XLIII. 66, no. 40682 (1918).

Berberis stenophylla Hance in Jour. Bot. XX. 257 (1882).—Fedde in Bot. Jahrb. XXXVI. beibl. LXXXII. 44 (1905).—Non Lindley.

Berberis Wallichiana Hemsley in Jour. Linn. Soc. XXIII. 32 (1886).—Maximowicz in Act. Hort. Petrop. XI. 42 (1890).—Diels in Bot. Jahrb. XXIX. 341 (1900), quoad specimen coll. a Piasezki.—Non De Candolle.

Berberis levis Schneider in Bull. Herb. Boissier, sér. 2, VIII. 198 (1908), quoad specimina e Shensi et synonyma citata.—Non Franchet.

SHENSI: Tai pei shan, *W. Purdom*, no. 7, 1910; Tsin ling shan, *P. J. Piasezki* (ex Hemsley, l. c., Maximowicz, l. c., and Diels, l. c.); Ngo shan, Kan y shan, Kan y huo, *G. Giraldi* (ex Fedde, l. c.).—See also Schneider, l. c. (1908 and 1917).

KANSU: near Kwa tsa, on decomposed rock slope, alt. 1400 m., *F. N. Meyer*, no. 1823, November 9, 1914.—See also Schneider, l. c. (1917), and Meyer, l. c.

DISTRIBUTION: also Szechuan.

Berberis diaphana Maximowicz in Bull. Acad. Sci. St. Pétersb. XXIII. 309 (1876); in Mél. Biol. IX. 712 (1877); Fl. Tangut. 32, t. 8, fig. 1–7 (1889); in Act. Hort. Petrop. XI. 42 (1890).—Hemsley in Jour. Linn. Soc. XXIII. 31 (1886).—Kanitz in Szechenyi, Keletazs. Utján. Tudom. Ered. II. 794 (Pl. Enum. 6) (1891); in Szechenyi, Wiss. Ergeb. Reise Ostas. II. 681 (1898).—Schneider in Bull. Herb. Boissier, sér. 2, v. 398 (1905); VIII. 195 (1908).—Fedde in Bot. Jahrb. XXXVI. beibl. LXXXII. 44 (1905).—Rehder in Sargent, Trees & Shrubs, II. 19, t. 109 (1907).

SHENSI: *G. Giraldi* (ex Fedde, l. c.).

KANSU: *N. Przewalski* and *G. N. Potanin* (fragments of specimens).—See also Maximowicz, l. c. (1876, 1889 and 1890), Hemsley, l. c., and Kanitz, l. c.

DISTRIBUTION: also Szechuan.

Berberis circumserrata Schneider in Sargent, Pl. Wilson. III. 435 (1917).—Hers in Jour. N. China Branch R. As. Soc. LIII. 107 (1922); Liste Ess. Lign. Honan, 4 (1922).

Berberis diaphana var. *circumserrata* Schneider in Sargent, Pl. Wilson. I. 354 (1913).

SHENSI: Tai pei shan, *W. Purdom*, no. 4, 1910.—See also Schneider, l. c.

HONAN: Lushih, Lao kiun shan, alt. 2000 m., *J. Hers*, no. 1202, September 21, 1919.—See also Hers, l. c.

The specimen from Honan is sterile, but agrees exactly with Purdom's specimen and there can be little doubt that it belongs to this species.

Berberis parvifolia Sprague in Kew Bull. Misc. Inform. 1908, 445.—Schneider in Sargent, Pl. Wilson. III. 436 (1917).

KANSU: Choni and Tow chou districts, alt. 2600–3000 m., *W. Purdom*, no. 826 (seeds only; plants raised from this seed growing in the Arnold Arboretum).—See also Schneider, l. c.

DISTRIBUTION: also Szechuan.

Berberis Potaninii Maximowicz in Act. Hort. Petrop. XI. 41 (1890).—Bretschneider, Hist. Eur. Bot. Discov. China, 1025 (1898).—Schneider in Bull. Herb. Boissier, sér. 2, VIII. 199 (1908).—Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds Pl. Imp. XLIII. 66, no. 40681 (1918).

Berberis sphalera Fedde in Bot. Jahrb. XXXVI. beibl. LXXXII. 44 (1905).

Berberis Liechtensteinii Schneider in Sargent, Pl. Wilson. I. 377 (1913).

SHENSI: near Shan lien li, on rocky slopes, *F. N. Meyer*, no. 1926, September 17, 1914.—See also Fedde, l. c., and Schneider, l. c. (1908).

KANSU: near Chu kun, southwestern Kansu, on rocky dry slopes, *F. N. Meyer*, no. 1984, October 18, 1914.—See also Maximowicz, l. c., and Meyer, l. c.

DISTRIBUTION: also Szechuan.

Schneider himself identified in 1916 his *B. Liechtensteinii* with *B. Potaninii* Maxim. (in sched. herb. Arnold Arb.).

Berberis aggregata Schneider in Bull. Herb. Boissier, sér. 2, VIII. 203 (1908).—Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds Pl. Imp. XLIII. 67, no. 40687 (1918).

Berberis sinensis var. *crataegina* Maximowicz in Act. Hort. Petrop. XI. 40 (1890).—Non Regel.

KANSU: Liang dja pa, *F. N. Meyer*, no. 1811, October 20, 1914; valley of river Hei ho and river Pei shui, *G. N. Potanin* (ex Maximowicz, l. c., and Schneider, l. c.); near Siku (ex Meyer, l. c.).

DISTRIBUTION: also Szechuan.

Berberis Vernae Schneider in Sargent, Pl. Wilson. I. 372 (1913); in Möller's Deutsch. Gärtn.-Zeit. XXXV. 82, fig. (1917).

Berberis Caroli var. *hoanghensis* Schneider in Bull. Herb. Boissier, sér. 2, V. 459 (1905).

KANSU: Min chow, alt. 2500–3000 m., *W. Purdom*, no. 1047, 1910.

DISTRIBUTION: also Szechuan.

Berberis Caroli Schneider in Bull. Herb. Boissier sér. 2, V. 459 (1905).

Berberis integerrima var. *stenophylla* Maximowicz, Fl. Tangut. 29 (1889); in Act. Hort. Petrop. XI. 41 (1890).

KANSU: Tao ho, *G. N. Potanin* (ex Maximowicz, l. c.).

Berberis Purdomii Schneider in Sargent, Pl. Wilson. I. 372 (1913).

SHENSI: south of Yenan Fu, *W. Purdom*, no. 3, 1910, Yenan Fu, *W. Purdom*, no. 345, 1910.—See also Schneider, l. c.

Berberis Poiretii Schneider in Mitt. Deutsch. Dendr. Ges. XV. 180 (1906); in Bull. Herb. Boissier, sér. 2, VIII. 258 (1908).

Berberis chinensis Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 78 (Enum. Pl. Chin. Bor. 4) (1833).—Non Poiret.

Berberis sinensis Turczaninow in Bull. Soc. Nat. Moscou, X. no. VII. 149 (1837).—Hemsley in Jour. Linn. Soc. XXIII. 31 (1886), quoad specimina e Chili.—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 469 (Ind. Fl. Pekin.) (1859); in Act. Hort. Petrop. XI. 40 (1890).—Bretschneider, Hist. Eur. Bot. Discov. China, 52, 172 (1898).—Non Desfontaines.

Berberis sinensis β. *angustifolia* Regel in Act. Hort. Petrop. II. 416 (1873).—Hance in Jour. Bot. XIII. 130 (1875).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 178 (Pl. David. I. 26) (1882).—Palibin in Act. Hort. Petrop. XIV. 108 (1895).

CHILI: Hsiao Wu tai shan, stony places, *F. N. Meyer*, nos. 1094, 1384, August 4 and 30, 1913; Nei chwang, western hills, *J. Hers*, no. 2223, October 11, 1922; Huai lai hsien, Liu shu chwang, alt. 800 m., *J. Hers*, no. 2082, October 3, 1922; Men tow kow, *J. Hers*, no. 2560, July 8, 1923; Po hua shan, *J. Hers*, no. 1670, September 9, 1921; Tsing shui tsien, *J. Hers*, no. 1631, September 6, 1921; Shih wen, on stony and pebbly hillsides, *F. N. Meyer*, no. 1073, August 2, 1913; near San tun ying, *F. N. Meyer*, no. 960, May 29, 1913.—See also Bunge, l. c., Hemsley, l. c., Maximowicz, l. c., Regel, l. c., Hance, l. c., Franchet, l. c., Palibin, l. c., and Schneider, l. c. (1908).

DISTRIBUTION: also Mongolia, Manchuria, Amurland.

The specimen mentioned and described by Schneider as a remarkable but incomplete specimen from Weichang collected by Purdom (in Sargent, Pl. Wilson. I. 373 [1913]) I consider an abnormal form of *B. Poiretii*.

It is unfortunate and misleading to the uninitiated that the species which bears according to the rule of priority the name *B. chinensis* Poir. (*B. sinensis* Desf.) is not a Chinese but a Caucasian species which had been described and named from cultivated plants supposed to have been raised from Chinese seed.

Berberis Poiretii f. **weichangensis** Schneider in Sargent, Pl. Wilson. I. 372 (1913).

CHILI: east of Weichang, *W. Purdom*, nos. 2 and 35.—See also Schneider, l. c.

This form differs very little from typical *B. Poiretii*.

Berberis Dielsiana Fedde in Bot. Jahrb. XXXVI. beibl. LXXXII. 41 (1905).—Schneider in Bull. Herb. Boissier, sér. 2, VIII. 261 (1908), quoad specimen Giraldii; in Sargent, Pl. Wilson. III. 441 (1917).—Hers in Jour. N. China Branch R. As. Soc. LIII. 107 (1922); Liste Ess. Lign. Honan, 4 (1922).

Berberis Henryana Schneider in Bull. Herb. Boissier, sér. 2, VIII. 261 (1908), quoad specimina Giraldii.

Berberis Poiretii Hers in Jour. N. China Branch R. As. Soc. LIII. 107 (1922); Liste Ess. Lign. Honan, 4 (1922).—Non Schneider.

HONAN: Yung ning, Ku hsien, alt. 800 m., *J. Hers*, no. 841, October 6, 1919; Yung ning, Tsi li ping, *J. Hers*, no. 443, May 22, 1919; Yung ning, Yo tze ping, alt. 1000 m., *J. Hers*, no. 827, October 4, 1919; Lushih, Kiao ho, alt. 1000 m., *J. Hers*, no. 982, October 13, 1919; Lushih, Tsi tsuen kow, alt. 800 m., *J. Hers*, no. 855, October 8, 1919; Lushih, Lao kiun shan, alt. 2000 m., *J. Hers*, no. 1167, September 21, 1919 (sterile); Sung hsien, Shih tze miao, *J. Hers*, no. 598, May 26, 1919; Cheng chow nursery, introduced from Sung shan, *J. Hers*, no. 332, April 24, 1921.

SHENSI: south of Yenan fu, *W. Purdom*, no. 341 (1910).—See also Fedde, l. c., and Schneider, l. c.

DISTRIBUTION: also Szechuan.

The specimens from Yung ning, Honan, differ somewhat in their smaller leaves of firmer texture.

Berberis dubia Schneider in Bull. Herb. Boissier, sér. 2, V. 663 (1905); VIII. 259 (1908).

Berberis sinensis Hemsley in Jour. Linn. Soc. XXIII. 31 (1886), quoad plantam e Kansu.—Non Desfontaines.

Berberis vulgaris Hemsley, l. c. (1886), quoad plantam e Kansu.—Non Linnaeus.

Berberis sinensis var. *crataegina* Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 178 (Pl. David. I. 26) (1882).—Maximowicz, Fl. Tangut. 33 (1889).—Non Regel.

Berberis vulgaris α. *normalis* Maximowicz in Fl. Tangut. 29 (1889); in Act. Hort. Petrop. XI. 41 (1890).—Non Hooker f. & Thomson.

Berberis vulgaris ε. *emarginata* Maximowicz in Act. Hort. Petrop. XI. 41 (1890).—Non Regel.

SHANSI: Ta tsing shan, *A. David* (ex Franchet, l. c., and Schneider, l. c. [1908]).

KANSU: *N. Przewalski*, *G. N Potanin* (ex Schneider, l. c. [1905 and 1908]).

DISTRIBUTION: also Mongolia.

I have seen no specimens of this species.

Berberis dasystachya Maximowicz in Bull. Acad. Sci. St. Pétersb. XXIII. 308 (1877); in Mél. Biol. IX. 711 (1877); Fl. Tangut. 30, t. 5, fig. 1–7 (1889); in Act. Hort. Petrop. XI. 41 (1890).—Hemsley in Jour. Linn. Soc. XXIII. 3 (1886).—Kanitz in Szechenyi, Keletazs. Utján. Tudom. Ered. II. 794 (Pl. Enum. 5) (1891); in Szechenyi, Wiss. Ergeb. Reise Ostas. II. 681 (1898).—Bretschneider, Hist. Eur. Bot. Discov. China, 971 (1898).—Schneider in Bull. Herb. Boissier, sér. 2, V. 664 (1905); VIII. 262 (1908).—Fedde in Bot. Jahrb. XXXVI. beibl. LXXXII. 43 (1905).—Schneider in Sargent, Pl. Wilson. III. 442 (1917).

Berberis heteropoda var. *oblonga* Maximowicz in Act. Hort. Petrop. XI. 41 (1890).—Non Regel.

? *Berberis dolichobotrys* Fedde in Bot. Jahrb. XXXVI. beibl. LXXXII. 41 (1905).

SHENSI: Tai pei shan, *W. Purdom*, nos. 1, 5, 9, 1910.—See also Fedde, l. c., and Schneider, l. c. (1908 and 1917).

KANSU: Min chow and Choni districts, *W. Purdom*, no. 1014, 1910; *N. Przewalski* (ex Maximowicz, l. c. [1877 and 1889], Schneider, l. c. [1905]), *G. N. Potanin* (ex Maximowicz, l. c. [1890], Schneider, l. c. [1908]), *L. Loczy* (ex Kanitz, l. c.).

DISTRIBUTION: also Hupeh and Szechuan.

Purdom's specimens from Kansu differ from typical *B. dasystachya* in the bright red-brown nearly terete branches and in the more remotely and less setosely serrulate leaves and may represent a distinct form.

Berberis Gilgiana Fedde in Bot. Jahrb. XXXVI. beibl. LXXXII. 43 (1905).—Schneider in Sargent, Pl. Wilson. I. 375 (1913).

SHENSI: Tai pei shan, *W. Purdom*, nos. 6, 8, 1910.—See also Fedde, l. c., and Schneider, l. c.

Berberis brachypoda Maximowicz in Bull. Acad. Sci. St. Pétersb. XXIII. 308 (1877); in Mél. Biol. IX. 711 (1877); Fl. Tangut. 30, t. 7, fig. 8–13 (1889).—Hemsley in Jour. Linn. Soc. XXIII. 31 (1886).—Bretschneider, Hist. Eur. Bot. Discov. China, 995 (1898).—Schneider in Bull. Herb. Boissier, sér. 2, VIII. 262 (1908).

SHENSI: Lung chow, Li kia po, alt. 1400 m., *J. Hers*, no. 2395.—See also Schneider, l. c.

KANSU: *P. J. Piasezki* (ex Maximowicz, l. c., Hemsley, l. c., and Bretschneider, l. c.).

DISTRIBUTION: also Hupeh.

Berberis brachypoda var. **salicaria** Schneider in Bull. Herb. Boissier, sér. 2, VIII. 262 (1908).

Berberis salicaria Fedde in Bot. Jahrb. XXXVI. beibl. LXXXII. 42 (1905).

SHENSI: *G. Giraldi* (ex Fedde, l. c., and Schneider, l. c.).

Berberis Giraldii Hesse in Mitt. Deutsch. Dendr. Ges. XXII. 272, fig. (1913).

SHENSI: *G. Giraldi* (seeds only; plants raised and distributed by H. A. Hesse, Weener, Germany).

This species differs from the preceding chiefly in its glabrous inflorescence.

Berberis amurensis Ruprecht in Bull. Phys.-Math. Acad. Sci. St. Pétersb. XV. 260 (1857).—Schneider in Bull. Herb. Boissier, sér. 2, VIII. 260 (1908); in Sargent, Pl. Wilson. I. 375 (1913).

Berberis vulgaris var. *amurensis* Regel in Act. Hort. Petrop. II. 414 (1873).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 177 (Pl. David. I. 25) (1882).—Palibin in Act. Hort. Petrop. XIV. 108 (1895).—Fedde in Bot. Jahrb. XXXVI. beibl. LXXXII. 41 (1905).

Berberis vulgaris Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 469 (Ind. Fl. Pekin.) (1859).—Hemsley in Jour. Linn. Soc. XXIII. 23 (1886), quoad plantam e Chili.—Gilg in Bot. Jahrb. XXXIV. beibl. LXXV. 35 (1904).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 124 (1919).—Non Linnaeus.

CHILI: Weichang, *W. Purdom*, no. 34, 1910; Hsiao Wu tai shan, alt. 1600 m., *F. N. Meyer*, no. 1231, August 20, 1913; same locality, *J. Hers*, no. 1480, July 14, 1921; Hsiao Wu tai shan, Tieh ling sze, alt. 1300 m., *J. Hers*, no. 2140, October 7, 1922.—See also Franchet, l. c., Palibin, l. c., and Schneider, l. c. (1908 and 1913).

?SHANTUNG: *O. Nebel*, *A. Engler* and *B. Krug* (ex Gilg, l. c. and ex Loesener, l. c.).

SHANSI: Wu tai shan, alt. 1600 m., *J. Hers*, no. 2631, July 29, 1923; Wu chai hsien, Ta nan kow, alt. 2000–3000 m., *Tchuang Kieh*, Hers no. 2037, September 7, 1922; Nan yang shan, alt. 2000 m., *J. Hers*, no. 2730, September 22–30, 1923.

SHENSI: Sze wu hsien, *F. N. Meyer*, no. 1719, September 1, 1914 (Herb. U. S. Dept. Agric.).—See also Fedde, l. c., and Schneider, l. c. (1908).

DISTRIBUTION: Amurland, Manchuria, Korea.

As I have seen no specimens from Shantung and the specimens cited by Gilg and by Loesener have been determined as *B. vulgaris*, I am not sure if they belong to this species, but they certainly cannot be identical with true *B. vulgaris* L.

Berberis Thunbergii DC., cited by Hemsley (in Jour. Linn. Soc. XXIII. 32 [1886]) as collected on the Tsung lin range according to Maximowicz and also enumerated by Diels (in Bot. Jahrb. XXIX. 341 [1900]) as collected by Piasezki on the Tsing ling shan, is certainly not true *B. Thunbergii*, but I have been unable to find a note on the correct determination of Piasezki's specimen.

Mahonia Bealii Carrière in Fl. des Serr. X. 166 (1855).—Takeda in Not. Bot. Gard. Edinb. VI. 225 (1917).—Hers in Jour. N. China Branch R. As. Soc. LIII. 112 (1922); Liste Ess. Lign. Honan, 18 (1922).

Berberis nepaulensis Hemsley in Jour. Linn. Soc. XXIII. 31 (1886), quoad plantam e "Tsunglin range."—Non Sprengel.

Mahonia japonica Diels in Bot. Jahrb. XXIX. 338 (1900).—Fedde in Bot. Jahrb. XXXVI. beibl. LXXXII. 41 (1905).—Non De Candolle.

HONAN: Sung hsien, Shih tze miao, *J. Hers*, no. 1291, September 25, 1919.—See also Hers, l. c.

SHENSI: Tsin ling shan, *P. J. Piasezki* (ex Hemsley, l. c., and Diels, l. c.), *G. Giraldi* (ex Fedde, l. c.).

DISTRIBUTION: Chekiang (*H. H. Hu*, no. 207), Hunan (*Handel-Mazzetti*, no. 836), Hupeh, Szechuan.

MENISPERMACEAE

Menispermum dauricum De Candolle, Syst. I. 540 (1818).—Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 78 (Enum. Pl. Chin. Bor. 4) (1833).—Turczaninov in Bull. Soc. Nat. Moscou, X. no. VII. 149 (1837), "dahuricum."—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 468 (Ind. Fl. Pekin.) (1859), "dahuricum;" in Bull. Acad. Sci. St. Pétersb. XXIX. 67 (1883); in Mél. Biol. XI. 647 (1883), "dahuricum;" in Act. Hort. Petrop. XI. 40 (1890), "davuricum."—Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 177 (Pl. David. I. 25) (1882); in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 198 (1884).—Hemsley in Jour. Linn. Soc. XXIII. 29 (1886).—Palibin in Act. Hort. Petrop. XIV. 108 (1895).—Bretschneider, Hist. Eur. Bot. Discov. 52, 1050 (1898).—Diels in Bot. Jahrb. XXXVI. beibl. LXXXII. 45 (1905); in Engler, Pflanzenr. IV.–94, 258 (1910), "dahuricum."—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 124 (1919).—Bailey, Gent. Herb. I. 23 (1920).—Cowdry in Jour. N. China Branch R. As. Soc. LIII. 160 (Pl. Peitaiho) (1922).

CHILI: Near San tun ying, *F. N. Meyer*, no. 949, May 28, 1913.—See also Bunge, l. c., Turczaninov, l. c., Maximowicz, l. c., Franchet, l. c. (1882), Hemsley, l. c., Palibin, l. c., Diels, l. c. (1910), and Cowdry, l. c.

SHANTUNG: Franchet, l. c. (1884), Hemsley, l. c., Diels, l. c. (1910), and Loesener, l. c.

HONAN: Chi kung shan, *L. H. Bailey* (ex Bailey, l. c.).

SHENSI: *W. Purdom*, no. 1146, 1910.—See also Diels, l. c. (1905 and 1910).

DISTRIBUTION: also Fokien (Hongkong Herb. no. 2335); Siberia, Mongolia, Manchuria, Korea, Japan.

Menispermum dauricum var. **pauciflorum** Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 177 (Pl. David. I. 25) (1882).

CHILI: Jehol, *A. David*, no. 1747 (ex Franchet, l. c.).

Sinomenium acutum var. **cinereum** Rehder & Wilson in Sargent, Pl. Wilson. I. 387 (1913).

Cocculus diversifolius Miq. var. *cinereus* Diels in Bot. Jahrb. XXXVI. beibl. LXXXII. 45 (1905).

Sinomenium diversifolium var. *cinereum* Diels in Engler, Pflanzenr. IV.–94, 255 (1910).

SHENSI: *G. Giraldi*, no. 4358 (ex Diels, l. c. 1905).

DISTRIBUTION: also Hupeh, Szechuan, Kweichow; of the type: Hupeh, Szechuan, Kweichow; Korea, Japan.

Cocculus trilobus De Candolle, Syst. I. 522 (1818).—Diels in Engler, Pflanzenr. IV.–94, 232 (1910).—Rehder & Wilson in Sargent, Pl. Wilson. I. 388 (1913).

Cocculus Thunbergii De Candolle, Syst. I. 524 (1818).—Maximowicz in Bull. Acad. Sci. St. Pétersb. XXIX. 70 (1883); in Mél. Biol. XI. 651 (1883).—Hemsley in Jour. Linn. Soc. XXIII. 28 (1886).—Faber, Denkschr. Entwickel. Kiautschou, 31 (1898).—Ito in Tokyo Bot. Mag. XIV. 74 (1900).—Gilg in Bot. Jahrb. XXXIV. beibl. LXXV. 35 (1904).—Diels in Bot. Jahrb. XXXVI. beibl. LXXXII. 45 (1905).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 124 (1919).—Bailey, Gent. Herb. I. 23 (1920).—Cowdry in Jour. N. China Branch R. As. Soc. LIII. 160 (Pl. Peitaiho) (1922).

Cocculus Thumbergii [*sic*] f. *trilobata* Debeaux in Act. Soc. Linn. Bordeaux, XXXI. 120 (Fl. Tché-foû, 25) (1876).

CHILI: Pei tai ho (ex Cowdry, l. c.).

SHANTUNG: Tsing tau, *R. Zimmermann*, no. 216.—See also Debeaux, l. c., Hemsley, l. c., Faber, l. c., Ito, l. c., Gilg, l. c., Loesener, l. c., Diels, l. c. (1910), and Rehder & Wilson, l. c.

HONAN: Chi kung shan, *L. H. Bailey* (ex Bailey, l. c.).

SHENSI: ex Diels, l. c. (1905 and 1910).

DISTRIBUTION: also Kiangsu, Chekiang, Fokien, Kiangsi, Hupeh, Hunan, Kweichow, Yunnan; Korea, Japan, Formosa, Philippines.

MAGNOLIACEAE

Magnolia parviflora Siebold & Zuccarini in Abh. Akad. Muench. IV. pt. II. 187 (Fl. Jap. Fam. Nat. I. 79) (1843).—Gilg in Bot. Jahrb. XXXIV. beibl. LXXV. 35 (1904).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 124 (1919).

SHANTUNG: Planted (ex Gilg, l. c., and Loesener, l. c.).

DISTRIBUTION: Korea, Japan.

Magnolia aulacosperma Rehder & Wilson in Sargent, Pl. Wilson. I. 396 (1913).—Hers in Jour. N. China Branch R. As. Soc. LIII. 112 (1922); Liste Ess. Lign. Honan, 18 (1922).

Magnolia sp. ex affinitate *M. stellatae* Diels in Bot. Jahrb. XXIX. 322 (1900); XXXVI. beibl. LXXXII. 38 (1905).

HONAN: Yungning, Tsi li ping, *J. Hers*, no. 457, May 22, 1919 ("flowers white;" young fruit); same locality, alt. 1000 m., *J. Hers*, no. 1343, September 13, 1919; Sung hsien, Suan kuan miao, *J. Hers*, no. 541, May 24, 1919 ("white flowers"); Lushih, Kiao ho, *J. Hers*, no. 964, October 12, 1919; Lushih, Tung ho, *J. Hers*, no. 991, October 14, 1919.—See also Hers, l. c.

SHENSI: "Shensi Sept.," *G. Giraldi*, 1897.—See also Diels, l. c.

DISTRIBUTION: also Hupeh.

Giraldi's specimen which was collected apparently in autumn agrees well in its leaves and flower-buds with *M. aulacosperma* and I have little doubt that it belongs here.

The flowers of this species are yet unknown; according to the notes on the labels of Hers' nos. 457 and 541 their color is white. Photographs of the tree from which Hers' specimen 964 was collected are in the photograph collection of this Arboretum; the tree is 18 m. tall with a trunk 1.20 m. in girth.

Magnolia denudata Desrousseaux in Lamarck, Encycl. Méth. III. 675 (1791), ex parte.—Rehder & Wilson in Sargent, Pl. Wilson. I. 399 (1913).—Bailey, Gent. Herb. I. 24 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 112 (1922); Liste Ess. Lign. Honan, 18 (1922).

Magnolia conspicua Salisbury, Parad. Lond. I. t. 38 (1806).—Maximowicz in Bull. Acad. Sci. St. Pétersb. XVII. 419 (1872); in Mél. Biol. VIII. 508 (1872).—Hemsley in Jour. Linn. Soc. XXIII. 23 (1886).—Faber in Denkschr. Entwickel. Kiautschou, 32 (1898).—Ito in Tokyo Bot. Mag. XIV. 73 (1900).—Gilg in Bot. Jahrb. XXXIV. beibl. LXXV. 35 (1904).—Loesener in Bot. Centralbl. Beih. XXXIV. abt. II. 124 (1919).

Magnolia Yulan Desfontaines, Hist. Arb. II. 6 (1809).—Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 77 (Enum. Pl. Chin. Bor. 3) (1833).

Magnolia Julan Turczaninov in Bull. Soc. Nat. Moscou, X. no. VII. 149 (1837).

CHILI: planted (ex Bunge, l. c., Maximowicz, l. c., and Hemsley, l. c.).

SHANTUNG: planted (ex Faber, l. c., Gilg, l. c., Ito, l. c., and Loesener, l. c.).

NORTHERN KIANGSU: Su kow, near Hai chow, *J. Hers*, no. 622, May 5, 1921.

HONAN: Sung hsien, Suan kuan miao, alt. 1200 m., *J. Hers*, no. 541-bis, May 24, 1919; Sung hsien, Shih tze miao, alt. 1200 m., *J. Hers*, no. 1254, September 25, 1919; Lushih, Lao kiun shan, alt. 2000 m., *J. Hers*, no. 1159, September 21, 1919; without locality, *J. Hers*, no. 38.—See also Bailey, l. c., and Hers, l. c.

DISTRIBUTION (including the variety): also Chekiang, Kiangsi, Hupeh; cultivated in Japan.

As no flowers of the Honan plant have been collected it remains doubtful if it belongs to the typical form or to var. *purpurascens* Rehder & Wilson which occurs in Hupeh.

Magnolia liliiflora Desrousseaux in Lamarck, Encycl. Méth. III. 675 (1791), ex parte.—Rehder & Wilson in Sargent, Pl. Wilson. I. 402 (1913).—Hers in Jour. N. China Branch R. As. Soc. LIII. 112 (1922); Liste Ess. Lign. Honan, 18 (1922).

Magnolia obovata Thunberg in Trans. Linn. Soc. II. 336 (1794), pro parte.—Gilg in Bot. Jahrb. XXXIV. beibl. LXXV. 35 (1904).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 124 (1919).

SHANTUNG: Cape Ya tau, near a temple (ex Gilg, l. c., and Loesener, l. c.).

HONAN: planted (ex Hers, l. c.).

DISTRIBUTION: also Kiangsu, Hupeh, Szechuan, but probably planted.

The native habitat of this plant which is much cultivated in China and Japan is probably southern China. The specimen from Shantung is probably from a planted tree and its correct identification is open to doubt, as it is stated to bloom in July.

Magnolia spec. Diels in Bot. Jahrb. xxxvi. beibl. lxxxii. 38 (1905), collected by Giraldi near Zulu, alt. 1500 m., possibly belongs to *M. denudata* Desrouss. which occurs in Honan and Hupeh, or it may belong to *M. Biondii* Pampan. from northern Hupeh which is erroneously credited to Shensi in Pl. Wilson. i. 408 (1913).

Schisandra chinensis Baillon, Hist. Pl. i. 148 (1867–1869).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 176 (Pl. David. i. 24) (1882).—Hemsley in Jour. Linn. Soc. xxiii. 25 (1886).—Finet & Gagnepain in Bull. Soc. Bot. France, lii. Mém. iv. 49 (1905); Contrib. Fl. As. Or. ii. 49 (1907).

Kadsura chinensis Turczaninov in Bull. Soc. Nat. Moscou, x. no. vii. 149 (1837).

Maximowiczia chinensis Ruprecht in Bull. Phys.-Math. Acad. Sci. St. Pétersb. xv. 259, in textu (1857).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. ix. 468 (Ind. Fl. Pekin.) (1859).

Chili: Jehol, *A. David*, no. 1839 (Gray Herb.); Weichang, *W. Purdom*, no. 117, 1909; Hsiao Wu tai shan, *F. N. Meyer*, no. 1347, August 23, 1913; Hsiao Wu tai shan, Shui shih tao, alt. 1500 m., *J. Hers*, no. 2154, October 8, 1922.—See also Turczaninow, l. c., Maximowicz, l. c., Franchet, l. c., Hemsley, l. c., and Finet & Gagnepain, l. c.

Distribution: also Manchuria, Korea, Japan.

Schisandra sphenanthera Rehder & Wilson in Sargent, Pl. Wilson. i. 414 (1913).—F. N. Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds Pl. Imp. xlii. 54, no. 40025 (1918).—Bailey, Gent. Herb. i. 24 (1920).—Hers in Jour. N. China Branch R. As Soc. liii. 115 (1922); Liste Ess. Lign. Honan, 28 (1922).

Schizandra chinensis Hemsley in Jour. Linn. Soc. xxiii. 25 (1886), quoad plantam e "Tsung lin range."—Maximowicz in Act. Hort. Petrop. xi. 39 (1890).—Diels in Bot. Jahrb. xxix. 322 (1900).

Honan: Yung ning, Tsi li ping, alt. 1000 m., *J. Hers*, nos. 424, 452, May 22, 1919 and no. 1335, September 3, 1919; Lushih, Hiung eul shan, alt. 1300 m., *J. Hers*, nos. 860, 887, October 9 and 10, 1919; Lushih, Liao kiun shan, alt. 2000 m., *J. Hers*, no. 1220, September 21, 1919; Sun hsien, Shih tze miao, alt. 1200 m., *J. Hers*, no. 1246, September 25, 1919; Teng Feng hsien, Yu tai shan, alt. 800 m., *J. Hers*, no. 243, April 23, 1919.—See also Bailey, l. c., and Hers, l. c.

Shensi: "Monte de Kian-san," *G. Giraldi*, August 4, 1909; Tai pei shan, *W. Purdom*, no. 1037, 1910; Kwan ying tang, *F. N. Meyer*, no. 1905, September 15, 1914 (Herb. U. S. Dept. Agric.).—See also Meyer, l. c., Diels, l. c., Hemsley, l. c., and Rehder & Wilson, l. c.

Kansu: Chi shan, near Cheng hsien, *F. N. Meyer*, no. 1750, October 1, 1914 (Herb. U. S. Dept. Agric.).

Distribution: also Kiangsi, Hupeh, Hunan (*Handel-Mazzetti*, nos. 11740, 11933), Yunnan.

Schisandra propinqua Hook. f. & Thoms. var. **sinensis** Oliver in Hooker's Icon. xviii. t. 1715 (1887).—Maximowicz in Act. Hort. Petrop. xi. 39

(1890).—Diels in Bot. Jahrb. XXIX. 322 (1900); in XXXVI. beibl. LXXXII. 39 (1905).

SHENSI: Lean shan, *G. Giraldi*, no. 6011 (ex Diels, l. c. [1905]).

KANSU: *P. J. Piasezki* (ex Maximowicz, l. c., and Diels, l. c. [1900]).

I have seen no specimens of *S. propinqua* var. *sinensis* from Kansu or Shensi and I am not quite sure if Giraldi's specimen from Shensi belongs here or to the preceding species, as the leaves on sterile shoots of *S. sphenanthera* are often ovate-oblong to elliptic-lanceolate and thus resemble those of this variety. Piasezki's specimen, however, certainly belongs to this variety according to Maximowicz's description.

CALYCANTHACEAE

Meratia praecox Rehder & Wilson in Sargent, Pl. Wilson. I. 419 (1913).—Bailey, Gent. Herb. I. 24 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 112 (1922); Liste Ess. Lign. Honan, 19 (1922).

Chimonanthus fragrans Lindley in Bot. Reg. VI. t. 451 (1820).—Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 101 (Enum. Pl. Chin. Bor. 27) (1833).—Hemsley in Jour. Linn. Soc. XXIII. 22 (1886).—Diels in Bot. Jahrb. XXIX. 345 (1900).

Calycanthus praecox Linnaeus, Spec. ed. 2, 718 (1762).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 125 (1919).

CHILI: Tang shan, hot springs, *F. N. Meyer*, no. 216, October, 1905.—See also Bunge, l. c., Hemsley, l. c., and Rehder & Wilson, l. c.

SHANTUNG: planted (ex Loesener, l. c.).

HONAN: Hsiao hsien, Huang tsang yu, alt. 200 m., cultivated, *J. Hers*, no. 1005, April 25, 1919.—See also Bailey, l. c., and Hers, l. c.

SHENSI: planted (ex Hemsley, l. c., and Maximowicz, l. c.).

KANSU: planted? (ex Maximowicz, l. c.).

DISTRIBUTION: also Kiangsu, Kiangsi, Hupeh, Szechuan, Hunan, Yunnan.

In northern China this species is probably cultivated wherever it has been collected and it is also often planted in other provinces of China as it is in Japan; its real home is apparently the Yangtsze valley from Hupeh to Szechuan.

Meratia praecox var. **grandiflora** Rehder & Wilson in Sargent, Pl. Wilson. I. 420 (1913).—Hers in Jour. N. China Branch R. As. Soc. LIII. 112 (1922); Liste Ess. Lign. Honan, 19 (1922).

HONAN: planted (ex Hers, l. c.).

This is a garden form, also occurring under cultivation in other provinces of China and in Japan.

LAURACEAE

Benzoin glaucum Siebold & Zuccarini in Abh. Akad. Muench. IV. pt. III. 205 (Fl. Jap. Fam. Nat. II. 81) (1846).—Bailey, Gent. Herb. I. 24 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 107 (1922); Liste Ess. Lign. Honan, 4 (1922).

Lindera glauca Blume, Mus. Bot. Lugd.-Bat. I. 325 (1850).—Faber, Denkschr. Entwickel. Kiautschou, 31 (1898).—Gilg in Bot. Jahrb. XXXIV. beibl. LXXV. 35 (1904).—Diels in Bot. Jahrb. XXXVI. beibl. LXXXII. 45 (1905).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 125 (1919).

? *Litsea* vel *Lindera* spec. Gilg in Bot. Jahrb. XXXIX. beibl. LXXXII. 35 (1904).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 125 (1919).

SHANTUNG: Lau shan, *F. N. Meyer*, no. 318, August, 1907.—See also Faber, l. c., Gilg. l. c., and Loesener, l. c.

NORTHERN KIANGSU: Liu lin shan, near Hai chow, *J. Hers*, no. 629, May 4, 1921; Hai chow hills, alt. about 200 m., *J. Hers*, nos. 2268, 2313, October 8, 1922.

HONAN: Mien chih, alt. 800 m., *J. Hers*, no. 53, August 20, 1919; Hsiao hsien, Huang tsang yu, alt. about 200 m., *J. Hers*, nos. 1008, 1020, April 25 and no. 1035, May 26, 1919; Chikung shan, *L. H. Bailey*, June 7, 1917 (Gray Herb.).—See also Bailey, l. c., and Hers, l. c.

SHANSI: Hia hsien, Huang lai kow, *J. Hers*, no. 1850, October 2, 1921; Yuan kiu hsien, Ni shan, *J. Hers*, no. 1826, September 28, 1921.

SHENSI: Lean shan, *G. Giraldi*, no. 4011 (ex Diels, l. c.).

DISTRIBUTION: also Kiangsi, Chekiang, Fokien, Hupeh, Hunan, Szechuan; Korea, Japan, Formosa.

I have little doubt that the Lindera spec. from the Lau shan cited by Gilg and by Loesener is identical with Meyer's specimen from the same locality. Hers' nos. 629 and 2313 from near Haichow, Kiangsu, differ from typical *B. glaucum* in their narrower leaves slightly silky beneath when young, glabrous at maturity, and in the short glabrescent pedicels of the flowers appearing in few-flowered sessile umbels.

Benzoin umbellatum (Thunb.) Rehder in Jour. Arnold Arb. I. 146 (1919).—Hers in Jour. N. China Branch R. As. Soc. LIII. 107 (1922); Liste Ess. Lign. Honan, 4 (1922).

Lindera membranacea Maximowicz in Bull. Acad. Sci. St. Pétersb. XII. 72 (1867); in Mél. Biol. VI. 275 (1867).—Diels in Bot. Jahrb. XXIX. 351 (1900).

Benzoin citriodorum Hers in Jour. N. China Branch R. As. Soc. LIII. 107 (1922); Liste Ess. Lign. Honan, 4 (1922).—Non Siebold & Zuccarini.

HONAN: Sung hsien, Shih tze miao, alt. 1200 m., *J. Hers*, nos. 486, 561, 583, May 26, 1919, no. 1261, September 25, 1919; Sung hsien, San kuan miao, alt. 1200 m., *J. Hers*, nos. 522, 540, May 24, 1919; Lushih, Hiung eul shan, alt. 1400 m., *J. Hers*, nos. 894, 895, 922, October 10, 1919; Lushih, Kiao ho, alt. 1000 m., *J. Hers*, nos. 971, 976, October 13, 1919; Lushih, Lao kiun shan, alt. 2000 m., *J. Hers*, nos. 1183, 1213, September 21, 1919; Tsi yuan hsien, *J. Hers*, no. 1750, September 21, 1921.—See also Hers, l. c.

SHENSI: Tai pei shan, *W. Purdom*, nos. 971, 973, 1910; Sze wu hsien, *F. N. Meyer*, no. 1720, September 1, 1914; Lung chow, Kuan shan, alt. 2000 m., *J. Hers*, no. 2344, July 3, 1922; "Shensi sept." *G. Giraldi*, 1897.—See also Diels, l. c.

KANSU: Chi shan, near Cheng hsien, *F. N. Meyer*, no. 1753, October 1, 1914 (Herb. U. S. Dept. Agric.).

DISTRIBUTION: also Chekiang, Hunan; Japan.

I have seen no flowering specimens of this species from northern China and therefore cannot be absolutely sure if the specimens cited above belong here, but in leaf and fruit they agree well with *B. umbellatum*.

Benzoin reflexum (Hemsley) Rehder in Jour. Arnold Arb. 1. 145 (1919).—Bailey, Gent. Herb. 1. 24 (1920).

HONAN: Chikung shan, *L. H. Bailey*, June 16, 1917 (Gray Herb.).—See also Bailey, l. c.

Benzoin fruticosum (Hemsley) Rehder in Jour. Arnold Arb. 1. 145 (1919).—Hers in Jour. N. China Branch R. As. Soc. LIII. 107 (1922); Liste Ess. Lign. Honan, 4 (1922).

HONAN: Sung hsien, Shih tze miao, *J. Hers*, no. 496, May 26, 1919; Sung hsien, San kuan miao, alt. 1200 m., *J. Hers*, no. 539, May 24, 1919; without precise locality, *J. Hers*, no. 40, 1918.—See also Hers, l. c.

The specimens cited above are all sterile and their determination therefore remains open to some doubt.

Benzoin cercidifolium Rehder in Jour. Arnold Arb. 1. 144 (1919).—Hers in Jour. N. China Branch R. As. Soc. LIII. 107 (1922); Liste Ess. Lign. Honan, 4 (1922).

Lindera cercidifolia Hemsley in Jour. Linn. Soc. XXVI. 387 (1891).—? Diels in Bot. Jahrb. XXXVI. beibl. LXXXII. 45 (1905).

HONAN: Sung hsien, Shih tze miao, *J. Hers*, no. 495, May 26, 1919; Sung hsien, San kuan miao, alt. 1200 m., *J. Hers*, no. 538, May 24, 1919; Lushih, Hiung eul shan, alt. 1400 m., *J. Hers*, no. 903, October 10, 1919; Lushih, Lao kiun shan, alt 2000 m., *J. Hers*, nos. 1152, 1193, September 21, 1919; Tsi yuan hsien, Tien tan shan, *J. Hers*, nos. 1697, 1749, September 16 and 21, 1921; without precise locality, *J. Hers*, no. 35, 1918.—See also Hers, l. c.

SHENSI: *G. Giraldi* (ex Diels, l. c.).

DISTRIBUTION: also Kiangsi, Hupeh, Szechuan.

Possibly Giraldi's specimens from Shensi referred by Diels to *B. cercidifolium* represent the following species, at least the specimen with pubescent leaves; *B. cercidifolium* as far as I know has the leaves always quite glabrous except axillary tufts of hairs beneath.

Benzoin obtusilobum Kuntze, Rev. Gen. Pl. 1. 569 (1891).

Lindera obtusiloba Blume, Mus. Bot. Lugd.-Bat. 1. 325 (1850).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 125 (1919).

Lindera obtusiloba var. *β. villosa* Meisner in De Candolle, Prodr. XV. pt. 1. 246 (1869).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 125 (1919).

Lindera triloba Franchet in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 250 (1884).—Hemsley in Jour. Linn. Soc. XXVI. 392 (1891).—Faber, Denkschr. Entwickel. Kiautschou, 31 (1898).—Gilg in Bot. Jahrb. XXXIV. beibl. LXXV. 35 (1904).—Non Blume.

? *Lindera cercidifolia* Diels in Bot. Jahrb. XXXVI. beibl. LXXXII. 45 (1905), tandem pro parte.—Vix Hemsley.

SHANTUNG: Lau shan, *F. N. Meyer*, no. 2588, August, 1907.—See also Franchet, l. c., Hemsley, l. c., Faber, l. c., Gilg, l. c., and Loesener, l. c.

NORTHERN KIANGSU: Liu lin shan, near Hai chow, *J. Hers*, no. 661, May 5, 1921; Hai chow hills, alt. 200 m., *J. Hers*, no. 2277, October 8, 1922.

SHENSI: southern slope of Tai pei shan, *W. Purdom*, no. 669[a], 1910; Tai pei shan, *W. Purdom*, no. 972, 1910.—See also Diels.

KANSU: near Fu orr yei, *F. N. Meyer*, no. 1974, October 7, 1914.

DISTRIBUTION: also Hupeh, Szechuan; Korea, Japan.

As stated above Giraldi's specimens referred to the preceding species by Diels probably belong here.

Machilus spec.? Faber, Denkschr. Entwickel. Kiautschou, 31 (1898).—Gilg in Bot. Jahrb. XXXIV. beibl. LXXV. 35 (1904).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 125 (1919).

As this reference apparently is not based on any existing specimens, its identification remains doubtful.

SAXIFRAGACEAE

Philadelphus pekinensis Ruprecht in Bull. Phys.-Math. Acad. Sci. St. Pétersb. XV. 365 (1857); Mél. Biol. II. 543 (1858).—Koehne in Gartenfl. XL. 597 (1896).—Bretschneider, Hist. Eur. Bot. Discov. China, 349, 1054 (1898).—Limpricht, Bot. Ergeb. Reis. Hochgeb. Chin. Ost-Tib. 402 (1922).

Philadelphus coronarius Turczaninov in Bull. Soc. Nat. Moscou, X. no. VII. 151 (1837).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 471 (Ind. Fl. Pekin.) (1859).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, VI. 5 (Pl. David. I. 125) (1883).

Philadelphus coronarius ζ. *pekinensis* Maximowicz in Mém. Acad. Sci. St. Pétersb. sér. 7, X. no. XVI. 42 (1867).—Hemsley in Jour. Linn. Soc. XXIII. 277 (1887).

CHILI: Jehol, *A. David*, no. 2219 (Gray Herb.); Peking, western hills, *J. Hers*, no. 2225, October 11, 1922, and no. 2515, June 10, 1923; Po hua shan, *J. Hers*, nos. 1462, 1680, July 1 and September 9, 1921; hills near Great Wall, Peking-Kalgan road, *J. G. Jack*, October 5, 1905; Hsiao Wu tai shan, open mountain slopes, *F. N. Meyer*, no. 1304, August 23, 1913; same locality, *J. Hers*, no. 1476, July 14, 1921; Hsiao Wu tai shan, Shiu shih tao, alt. 1500 m., *J. Hers*, nos. 2183, 2185, October 8, 1923; Miao feng shan, alt. 1000 m., *J. Hers*, no. 2539, June 18, 1923; Weichang, *W. Purdom*, no. 83, 1910; without locality, *Père Chanet*, no. 61, 1919; *W. Purdom*, no. 552 (seeds only; plants growing in the Arnold Arboretum).—See also Turczaninov, l. c., Ruprecht, l. c., Franchet, l. c., Maximowicz, l. c., Hemsley, l. c., Koehne, l. c., and Limpricht, l. c.

SHANSI: Wu chai hsien, Ta nan kow, alt. 2000 to 3000 m., *Tchuang Kieh*, Hers no. 2002, September 7, 1922; Wu tai shan, alt. 2600 m., *J. Hers*, no. 2642, July 31, 1923; Fang shan hsien, Nan yang shan, alt. 1500 to 2500 m., *J. Hers*, no. 2704, September 22–30, 1923.

SHENSI: Moutan shan, northwest of Hancheng Hsien, *W. Purdom*, no. 369, 1910.

DISTRIBUTION: also Manchuria.

The specimens cited above show some variation in the size of the flowers,

the petals varying between 1 cm. and 1.5 cm. in length, in the density of the inflorescence which may be very crowded with short pedicels 2–3 mm. long or slenderer, the lowest pairs of flowers about 2 cm. distant and the pedicels up to 6 mm. long, as in Hers' no. 1476 and in Purdom's no. 369, and in the pubescence of the leaves which may be perfectly glabrous or more or less bearded in the axils of the veins beneath and ciliate with long white hairs near the base; the specimen from Shensi is even more pubescent; the lower leaves are setose-pilose along the veins and even sparingly so on the under surface, the upper leaves which are rather narrow are nearly glabrous. The leaves also vary in size and somewhat in shape, being sometimes, particularly on vigorous shoots, rounded or nearly subcordate at base as in nos. 2225, 2642 and 2704.

These specimens with rounded to subcordate leaves make it probable that *P. rubricaulis* Carrière (in Rev. Hort. 1870–71, 460 [1871]) belongs here, the description, incomplete as it is, agrees well with *P. pekinensis*, but the description of the leaves as "cordiformes" seemed to be against this identification; the plant described was raised from seed sent by E. Simon from China, and probably from Peking from where he introduced a number of other plants to France.

Philadelphus pekinensis var. **dasycalyx** Rehder in Jour. Arnold Arb. I. 197 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 113 (1922); Liste Ess. Lign. Honan, 20 (1922).

HONAN: Hwei hsien, Shansi border, *J. Hers*, no. 713, June 19, 1919.—See also Rehder, l. c., and Hers, l. c.

SHANSI: Nan Yang shan, alt. 1500–2500 m., *J. Hers*, no. 2729, September 22–30, 1923.

The specimen from Shansi differs from the type in the broader ovate leaves mostly rounded at base and in the elongated inflorescence, the lowest pairs of flowers being 2.5–3 cm. distant.

Philadelphus laxiflorus, sp. nov.

Frutex 2–3-metralis; cortex ramulorum biennium cinereo-brunneus vel fere castaneus lamellis tenuibus solubilis; ramuli juveniles fusci glabri. Folia (ramulorum florentium tantum adsunt) elliptico-ovata vel elliptico-oblonga, 3–5.5 cm. longa et 1.6–2.5 cm. lata, acuminata, basi late cuneata, supra obscure viridia pilis brevibus setosis satis dense obtecta, subtus glaucescentia, ad venas primarias sparse setoso-pilosa et in axillis pilis longis albidis barbata, ceterum glabra, margine setoso-ciliolata et minute remoteque denticulata denticulis ad mucronem callosum reductis; petioli circiter 5 mm. longi, glabri vel sparsissime pilosi. Racemi 6–12 cm. longi, laxi, 9–11-flori, axi glabro, ramulos plerosque foliorum paria tria ex quibus duo florifera gerentes terminantes; pedicelli inferiora 6–8 mm. longi, ceteri apicem versus decrescentes; sepala elliptico-ovata, 7 mm. longa, acuminulata, extus ut ovarium campanulatum 4 mm. longum glabra, intus marginem et apicem versus tomentosa, medio glabrata; petala ovali-orbicularia, 1.6

cm. longa, stamina 30–35, 6–10 mm. longa, longiora stylum et dimidiam partem petalorum superantia; discus satis planus, glaber; stylus 8 mm. longus, glaber, ad medium divisus; stigmata antheris angustiora et secus marginem exteriorem eis paullo longiora.

SHENSI: valleys of Tai pei shan, *W. Purdom*, no. 439, June 30, 1910.

This species seems most nearly related to *P. pekinensis* Rupr. and *P. nepalensis* Koehne, but from both it is readily distinguished by the short-pilose and scabrid upper surface of the leaves and the deeply divided style, also by the longer and looser inflorescence with 9 to 11 flowers and by the larger flowers. In the pubescence of the leaves it resembles *P. sericanthus* Koehne, but that species has a pubescent calyx and the style divided only at the apex. *Philadelphus laxiflorus* is without doubt a very ornamental species, but has not yet been introduced into cultivation.

Philadelphus incanus Koehne in Gartenfl. XLV. 562 (1896), excl. no. 8823 Henryi.—Hers in Jour. N. China Branch R. As. Soc. LIII. 113 (1922); Liste Ess. Lign. Honan, 20 (1922).

Philadelphus subcanus Hers in Jour. N. China Branch R. As. Soc. LIII. 113 (1922); Liste Ess. Lign. Honan, 20 (1922).—Non Koehne.

HONAN: Yung ning, Tsi li ping, about 1100 m., *J. Hers*, no. 402, May 22, 1919; Tsi yuan hsien, Tien tan shan, *J. Hers*, no. 1783, September 21, 1921 (sterile); Sung hsien, San kuan miao, *J. Hers*, no. 542, May 24, 1919; Lushih, Tung ho, alt. 1000 m., *J. Hers*, no. 985, October 14, 1919.—See also Hers, l. c.

SHENSI: Kan y san, Kin qua san and Lao y san, *G. Giraldi*, June 12, July 10 and September 6, 1897.

DISTRIBUTION: also Hupeh.

The specimens under no. 542 and no. 985 differ in their less pubescent leaves from the type and had been tentatively referred to *P. subcanus*, but the character of the pubescence is the same as in *P. incanus* which seems to be a very variable species.

Philadelphus incanus var. **Baileyi** Rehder in Bailey, Gent. Herb. I. 27 (1920).

HONAN: Chi kung shan, alt. 500–800 m., *L. H. Bailey*, June 13, 1917.—See also Bailey, l. c.

Philadelphus sericanthus Koehne in Gartenfl. XLV. 561 (1896); in Bot. Jahrb. XXIX. 371 (1900).

SHENSI: In kia p'u, *G. Giraldi*, no. 1655 (ex Koehne, l. c.).

KANSU: Choni district, alt. 3000 m., *W. Purdom*, no. 1021, 1910.

DISTRIBUTION: also Hupeh, Szechuan.

Purdom's specimen from Kansu differs in the flaky bark and in the glaucescent underside of the leaves and may possibly represent a distinct species related to *P. laxiflorus* from which it differs, however, markedly in the pubescent calyx, the only slightly pubescent upper surface of the leaves and the slightly divided style.

Deutzia scabra Thunberg, Fl. Jap. 185 (1784).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 129 (1919).

SHANTUNG: Tsingtau, probably cultivated (ex Loesener, l. c.).

DISTRIBUTION: Japan.

Deutzia discolor Hemsley in Jour. Linn. Soc. XXIII. 275 (1887).—Engler in Bot. Jahrb. XXIX. beibl. LXXXII. 51 (1905).

SHENSI: Tai pei shan, *W. Purdom*, no. 1000, 1910.—See also Engler, l. c.

DISTRIBUTION: also Hupeh, Szechuan, Yunnan.

Deutzia albida Batalin in Act. Hort. Petrop. XIII. 97 (1893).—Bretschneider, Hist. Eur. Bot. Discov. China, 1028 (1898).—Rehder in Sargent, Pl. Wilson. I. 21 (1913).

Deutzia discolor var. *albida* Schneider in Mitt. Deutsch. Dendr. Ges. XIII. 183 (1904).

KANSU: Pao dji, *F. N. Meyer*, no. 1996, November 6, 1914 (Herb. U. S. Dept. Agric.); on the river Pei shui between Lidshapu and Kwan tin, *G. Potanin*, 1885 (ex Batalin, l. c., Schneider, l. c., and Rehder, l. c.).

Meyer's no. 1996 consists only of detached and partly broken leaves apparently collected from under the bushes after they had fallen and their determination is open to doubt, particularly so as I have no material for comparison; they agree with Batalin's description, but are larger, measuring up to 7 cm. in length and to 4 cm. in width.

Deutzia Vilmorinae Lemoine, Cat. no. 158, p. 7, fig. (1904).—Schneider in Mitt. Deutsch. Dendr. Ges. XIII. 182 (1904).

SHENSI: "Lao-y-san," June 4, 1897, and "Ta-sce-tsuen," September 18, *G. Giraldi*.

DISTRIBUTION: also Hupeh.

Deutzia grandiflora Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 104 (Enum. Pl. Chin. Bor. 50) (1833).—Turczaninov in Bull. Soc. Nat. Moscou, X. no. VII. 152 (1837).—Walpers, Rep. II. 152 (1843).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 471 (Ind. Fl. Pekin.) (1859); in Mém. Acad. Sci. St. Pétersb. sér. 7, X. no. XVI. 30, t. 3, fig. 1–13 (1867); in Bull. Soc. Nat. Moscou, LIV. 21 (1879).—Hance in Jour. Bot. XIII. 132 (1875).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, VI. 5 (Pl. David. I. 125) (1883); in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 217 (1884).—Hemsley in Jour. Linn. Soc. XXIII. 276 (1887).—Bretschneider, Hist. Eur. Bot. Discov. China, 53, 333 (1898).—Rehder in Sargent, Pl. Wilson. I. 21 (1913).—Bailey, Gent. Herb. I. 27 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 109 (1922); Liste Ess. Lign. Honan, 11 (1922).

Deutzia grandiflora var. *β. minor* Maximowicz in Mém. Acad. Sci. St. Pétersb. sér. 7, X. no. XVI. 31 (1867).—Palibin in Act. Hort. Petrop. XIV. 119 (1895).—Rehder in Sargent, Pl. Wilson. I. 21 (1913).

Deutzia grandiflora var. *α. typica* Schneider in Mitt. Deutsch. Dendr. Ges. XIII. 184 (1904).

CHILI: Weichang, *W. Purdom*, nos. 16, 1068, 1910; near San tung ying, *F. N. Meyer*, no. 953, May 29, 1913; western hills near Peking, *W. Purdom*, no. 1069, 1910; same locality, *J. Hers*, nos. 1398, 1578, May 15 and August 7, 1921; hills near Great Wall, Kalgan road, *J. G. Jack*, October 5, 1905; Nankow pass, *J. Hers*, no. 1603, August 15, 1921; Miao feng shan, alt. 1000 m., *J. Hers*, no. 2531, June 17, 1923; "Chin. bor.;" ex Herb. Bunge (Gray Herb.).—See also Bunge, l. c., Turczaninov, l. c., Walpers, l. c., Maximowicz, l. c. (1859 and 1867), Hance, l. c., Franchet, l. c. (1883), Hemsley, l. c., Bretschneider, l. c., Schneider, l. c., Rehder, l. c., Bailey, l. c., and Palibin, l. c.

Shantung: Chifu (ex Maximowicz, l. c. [1879], and Franchet, l. c. [1884]).

DISTRIBUTION: also Hupeh, Manchuria.

I do not think that Maximowicz's var. *minor* can be retained as a distinct variety; the material upon which the variety is based probably came from stunted plants as the description seems to indicate. There is considerable variation in the size of the leaves and of the flowers and in the length of the style, apparently without correlation.

Deutzia grandiflora var. **glabrata** Maximowicz in Mém. Acad. Sci. St. Pétersb. sér. 7, x. no. XVI. 31 (1867).—Schneider in Mitt. Deutsch. Dendr. Ges. XIII. 184 (1904).—Rehder in Sargent, Pl. Wilson. I. 22 (1913).

Deutzia Baroniana Diels in Bot. Jahrb. XXIX. 372 (1900).

Deutzia grandiflora var. *Baroniana* Rehder in Sargent, Pl. Wilson. I. 21 (1913).—Limpricht, Bot. Reis. Hochgeb. Chin. Ost-Tib. 402 (1922).—Hers in Jour. N. China Branch R. As. Soc. LIII. 109 (1922); Liste Ess. Lign. Honan, 11 (1922).

Deutzia grandiflora Hers, l. c.

CHILI: Peking, western hills, *J. Hers*, no. 1617, September 5, 1921; Po hua shan, *J. Hers*, nos. 1406, 1416, May 1, 1921; Hsiao Wu tai shan, *F. N. Meyer*, no. 1230[a], August 20, 1913; Ta hung men, *J. Hers*, no. 2216, October 10, 1922; near Peking, *Tatarinov*, (fragments from Herb. St. Petersb.).—See also Maximowicz, l. c., Schneider, l. c., Rehder, l. c., and Limpricht, l. c.

HONAN: Teng feng hsien, Yu tai shan, alt. about 800 m., *J. Hers*, no. 202, April 23, 1919; Yu tai shan, *J. Hers*, nos. 319 and 323, April 20 and April, 1920; Hwei hsien, Ta fu sze, *J. Hers*, no. 747, June 16, 1919; Yung ning, Yo tze ping, alt. 1000 m., *J. Hers*, no. 835, October 5, 1919; Yung ning, Chuan pao shan, alt. 1500 m., *J. Hers*, no. 1109, October 17, 1919; Sung hsien, San kuan miao, alt. 1000 m., *J. Hers*, no. 1318, September 27, 1919; Tsi yuan hsien, alt. 500 m., *J. Hers*, no. 2653, August 22, 1923.—See also Hers, l. c.

SHENSI: "Ta sce tsuen," *G. Giraldi*, September 19, 1897; "Huo kia zaez," *G. Giraldi*, no. 2519; northwest of Han chung hsien, *W. Purdom*, no. 999, 1910.—See also Diels, l. c., Schneider, l. c., and Rehder, l. c.

With the copious material before me I am unable to distinguish between var. *glabrata* and var. *Baroniana*; there are all intergradations present between leaves which have the underside fairly densely covered with

stellate hairs and those with scattered stellate hairs; in the latter case the hairs have usually more (6–9) and shorter rays and are more regularly stellate while in specimens with denser pubescence the hairs have fewer (4–7) rays often elongated and with a central ray developed, particularly those on the veins which gives to the pubescence a pilose character.

Deutzia prunifolia Rehder in Sargent, Pl. Wilson. I. 22 (1913).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 130 (1919).

Deutzia parviflora Cowdry in Jour. N. China Branch R. As. Soc. LIII. 164 (Pl. Peitaiho) (1922).—Non Bunge.

CHILI: Lotus hills, Pei tai ho, common, *N. H. Cowdry*, no. 157, May 28, 1919.—See also Cowdry, l. c.

SHANTUNG: Tai shan, *J. Hers*, no. 1925, June 18, 1922.—See also Loesener, l. c.

NORTHERN KIANGSU: Liu lin shan, near Hai chow, *J. Hers*, nos. 606, 614, 649, May 5, 1921.

DISTRIBUTION: also Korea.

Like the preceding this species varies greatly in the size of the flowers in the same locality as in Hers' specimens from the hills near Hai chow of which nos. 614 and 649 have the petals 10–12 mm. long, while in no. 606 they are 18 mm. long.

Deutzia hamata Koehne in Bot. Jahrb. XXXIV. beibl. LXXV. 37 (1904).—Rehder in Sargent, Pl. Wilson. I. 22 (1913).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 130, t. 5, fig. F–J (1919).

SHANTUNG: Lau shan (ex Koehne, l. c., and Loesener, l. c.).—See also Rehder, l. c.

The chief distinguishing character of this species, the peculiar rim-like excrescence of the disk on the inside of the stamens is very pronounced in Koehne's original drawing of which the author kindly sent me a copy in 1913, being strongly incurved and covering the larger part of the top of the ovary, while in the figure cited above this rim is much shorter and upright, and similar, only somewhat higher, to the corresponding structure found in *D. grandiflora* and *D. prunifolia*.

Deutzia parviflora Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 105 (Enum. Pl. Chin. Bor. 51) (1833).—Turczaninov in Bull. Soc. Nat. Moscou, X. no. VII. 152 (1837).—Walpers, Rep. II. 152 (1843).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 471 (Ind. Fl. Pekin.) (1859); in Mém. Acad. Sci. St. Pétersb. sér. 7, X. no. XVI. 33, t. 3, fig. 18–23 (1867).—Hance in Jour. Bot. XIII. 132 (1875).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, VI. 5 (Pl. David. I. 124) (1883).—Hemsley in Jour. Linn. Soc. XXIII. 276 (1887).—Bretschneider, Hist. Eur. Bot. Discov. China, 53, 333, 1054 (1898).—Rehder in Sargent, Pl. Wilson. I. 23 (1913).—Limpricht, Bot. Reis. Hochgeb. Chin. Ost-Tib. 402 (1922).

Deutzia parviflora α. *Bungei* Franchet in Jour. de Bot. X. 283 (1896).

Deutzia parviflora β. *mongolica* Franchet, l. c.

Deutzia corymbosa var. *parviflora* Schneider in Mitt. Deutsch. Dendr. Ges. XIII. 184 (1904).

CHILI: Weichang, *W. Purdom*, no. 40, 1910; Peking, western hills, *J. Hers*, no. 1618, September 5, 1921; Po hua shan, *J. Hers*, nos. 1442, 1474, July 1 and 14, 1921; Hsiao Wu tai shan, *F. N. Meyer*, no. 1230, August 20, 1913; *J. Hers*, nos. 1496 and 1553, July 14, 1921; *N. H. Cowdry*, no. 1662, July 13, 1921; Hsiao Wu tai shan, Tieh ling sze, alt. 1300 m., *J. Hers*, no. 2138, October 7, 1922; Hsiao Wu tai shan, Shui shih tao, alt. 1500 m., *J. Hers*, nos. 2161, 2163, October 8, 1922; Tung ling Mountains, *N. H. Cowdry*, no. 1324, May, 1921, and no. 2150, May 18, 1921; without precise locality, *Père Chanet*, nos. 5, 1918, and 57, 1919.—See also Bunge, l. c., Turczaninov, l. c., Walpers, l. c., Maximowicz, l. c., Hance, l. c., Franchet, l. c., Hemsley, l. c., Rehder, l. c., and Limpricht, l. c.

HONAN: Tsi yuan hsien, alt. 500 m., *J. Hers*, no. 2661, August 24, 1923; Tsi yuan hsien, Tien tan shan, *J. Hers*, nos. 1743, 1744, 1898, September 21, 1921; Yung ning, Tsi li ping, *J. Hers*, no. 1377, September 30, 1919.

KANSU: south of the Hoang ho, *P. J. Piasezki* (ex Hemsley, l. c.).

DISTRIBUTION: also Manchuria.

For geographical reasons it is probable that the Kansu plant belongs to the var. *micrantha*.

Deutzia parviflora var. **ovatifolia** Rehder in Jour. Arnold Arb. 1. 210 (1920).

CHILI: Weichang, *W. Purdom*, no. 40 (in part), 1910.

This variety which is based on cultivated plants raised from seed sent by W. Purdom under no. 40 differs chiefly in its distinctly ovate leaves, rounded or truncate at the base and very sparingly stellate-pubescent above and glabrous beneath; in the latter character it agrees with Franchet's var. *Bungei* but that variety, as its name implies, is based on the type of *D. parviflora* which has oblong-obovate leaves according to Bunge's description.

Deutzia parviflora var. **micrantha**, var. nov.

Deutzia micrantha Engler in Bot. Jahrb. XXXVI. beibl. LXXXII. 51 (1905).—Rehder in Sargent, Pl. Wilson. 1. 23 (1913).

SHENSI: Tsin ling shan, *G. Giraldi*, no. 7179 (photograph in herb. Arnold Arb.); In-kia-po, *G. Giraldi*, June 4, 1897; Kin-san, *G. Giraldi*, 1897; Tai pei shan, *W. Purdom*, no. 1040, 1910; "monte Lun-san-huo" *G. Giraldi*, no. 783, May 23, 1892.—See also Engler, l. c., and Rehder, l. c.

There are apparently no constant characters to separate *D. micrantha* Engl. as a species from *D. parviflora* with which unfortunately Engler did not compare it; according to the specimens cited above the variety may be distinguished by its generally smaller flowers with petals 3.5–5 mm. long, and by the denser pubescence of the underside of the leaves which are elliptic-ovate to ovate-lanceolate or oblong-lanceolate and cuneate at base. The stellate hairs have 7–11 rays and are often so close as to touch each other; particularly near the veins they often develop an

elongated central ray usually with a corresponding reduction of the lateral rays, which gives a pilose appearance to the pubescence. The pubescence is very dense in Giraldi's specimens from In-kia-po and from Kin-san and rather scattered in Purdom's specimens from the Tai pei shan. In typical *D. parviflora* the pubescence of the underside of the leaves is usually very slight and sometimes nearly wanting. The size of the flowers affords no clear distinction as e. g. Komarov's no. 836 from Manchuria and part of Purdom's no. 40 from Chili have flowers with petals not exceeding 5 mm. in length.

As stated under *D. parviflora* Piasezki's specimens from Kansu referred by Hemsley to *D. parviflora* probably belong here.

Deutzia corymbosa R. Brown apud Royle, Ill. Bot. Himal. 216, t. 46, fig. 2 (1839).—Diels in Bot. Jahrb. XXIX. 371 (1900).—Engler in Bot. Jahrb. XXXVI. beibl. LXXXII. 51 (1905).

SHENSI: Tui kio shan, *G. Giraldi*, no. 1120 (ex Diels, l. c.) and Ki fon shan, *G. Giraldi*, no. 4504 (ex Engler, l. c.).

It is very doubtful if these specimens belong to *D. corymbosa* R. Br. It is more likely that they are referable to *D. parviflora* and probably to *D. parviflora* var. *micrantha*.

Deutzia glabrata Komarov in Act. Hort. Petrop. XXII. 433 (1903).—Schneider in Mitt. Deutsch. Dendr. Ges. XIII. 185 (1904).—Rehder in Sargent, Pl. Wilson. I. 24 (1913).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 130 (1919).

Deutzia glaberrima Koehne in Bot. Jahrb. XXXIV. beibl. LXXXII. 38 (1904).

SHANTUNG: Lau shan (ex Schneider, l. c., Koehne, l. c., Rehder, l. c., and Loesener, l. c.).

DISTRIBUTION: also Korea.

Deutzia hypoglauca Rehder in Sargent, Pl. Wilson. I. 24 (1913).

SHENSI: valley leading to Tai pei shan, alt. about 2500 m., *W. Purdom*, no. 428, 1910.

DISTRIBUTION: also Hupeh, Yunnan (*Delavay*, no. 986).

Hydrangea Bretschneideri Dippel, Handb. Laubholzk. III. 320 (1893).—Rehder in Sargent, Pl. Wilson. I. 38 (1913).

Hydrangea pubescens "Dne?" Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 472 (Ind. Fl. Pekin.) (1859).—Non Decaisne.

Hydrangea vestita var. *pubescens* Maximowicz in Mém. Acad. Sci. St. Pétersb. X. no. XVI. 10 (1867), excl. synon. Decaisne.—Franchet in Nouv. Arch. Mus. Paris, sér. 2, VI. 5 (Pl. David. I. 124) (1883).—Sargent in Gard. & Forest, III. 17, fig. 3 (1890).—Palibin in Act. Hort. Petrop. XIV. 119 (1895).—Bretschneider, Hist. Eur. Bot. Discov. China, 348, 565, 1054 (1898).

Hydrangea vestita Hemsley in Jour. Linn. Soc. XXIII. 274 (1887).—Non Wallich.

CHILI: Weichang, *W. Purdom*, no. 76[a], 1910; Po hua shan, *J. Hers*, nos. 1448 and 1672, July 1 and September 9, 1921; Hsiao Wu tai shan,

J. Hers, nos. 1478 and 1560, July 14 and July 16, 1921; *F. N. Meyer*, no. 1322, August 23, 1913; Hsiao Wu tai shan, Shui shih tao, alt. 1500 m., *J. Hers*, no. 2150, October 8, 1922; Tung ling, *B. E. Read*, no. 103 (Herb. N. E. Cowdry, no. 2203); without precise locality, *Père Chanet*, no. 58, 1919.—See also Rehder, l. c., Maximowicz, l. c., Franchet, l. c., Hemsley, l. c., and Palibin, l. c.

KANSU: Min chow, *W. Purdom*, no. 1020, 1910; Choni district, *W. Purdom*, no. 1131, 1910.

The original description of this species was based on cultivated plants raised from seed distributed by Dr. Bretschneider about 1880.

Hydrangea Bretschneideri var. **glabrescens** Rehder in Mitt. Deutsch. Dendr. Ges. XXI. 186 (1912).—Limpricht Bot. Reis. Hochgeb. Chin. Ost.-Tib. 402 (1922), as forma.

Hydrangea serrata Koehne, Deutsche Dendr. 189 (1893).—Non De Candolle.
Hydrangea xanthoneura var. *glabrescens* Rehder in Bailey, Cycl. Am. Hort. II. 784 (1900).

CHILI: Weichang, *W. Purdom*, no. 76, 1910; Hsiao Wu tai shan, *J. Hers*, no. 1484, July 14, 1921; without precise locality, *W. Purdom*, no. 978, 1910; *Père Chanet*, no. 26, 1918.—See also Limpricht, l. c.

SHANSI: Wu tai shan, alt. 1600 m., *J. Hers*, no. 2632, July 29, 1923; Wu chai hsien, Ta nan kow, alt. 2000–3000 m., *Tchuang Kieh*, Hers no. 2031, September 7, 1922.

SHENSI: Tsing ling shan (ex Limpricht, l. c.).

This, like the type of the species, was originally described from cultivated plants raised from seed sent by Dr. Bretschneider. It should perhaps be considered a form, as proposed by Limpricht, rather than a variety.

Hydrangea xanthoneura Diels var. **Wilsonii** Rehder in Sargent, Pl. Wilson. I. 27 (1913).

HONAN: Tsi yuan hsien, Tien tan shan, *J. Hers*, nos. 1752, 1761, September 21, 1921.

SHENSI: Kin qua san, *G. Giraldi*, July 10, 1897; Kian san, *G. Giraldi*, August 4, 1897; without precise locality, *G. Giraldi*, 1897; Tai pei shan, *W. Purdom*, no. 976, 1910.

DISTRIBUTION: also Hupeh, Szechuan, Yunnan.

Hydrangea xanthoneura var. **setchuenensis** Rehder in Mitt. Deutsch. Dendr. Ges. XXI. 186 (1912).

Hydrangea Giraldii Diels in Bot. Jahrb. XXIX. 373 (1900).
Hydrangea Bretschneideri var. *setchuenensis* Rehder in Sargent, Pl. Wilson. I. 28 (1913).
Hydrangea Bretschneideri var. *Giraldii* Rehder, l. c. 39 (1913).

SHENSI: various localities, *G. Giraldi* (ex Diels, l. c.).

DISTRIBUTION: also Hupeh, Szechuan.

There seems to be no reliable character to distinguish *H. Giraldii* Diels of which I have seen no specimen except a photograph of one of the types from *H. xanthoneura* var. *setchuenensis*; the fact that the leaves of the

latter are usually rounded at base and those of the former cuneate can hardly be considered a sufficient character and moreover the shape of the base is not constant as no. 1323 of var. *setchuenensis* shows which has cuneate leaves. All the specimens of Giraldi's collection received from the Herbarium in Florence under the name *H. Giraldii* had the underside of the leaves nearly glabrous and have been referred here to the preceding variety.

Hydrangea xanthoneura and *H. Bretschneideri* are very closely related and both vary with pubescent and glabrescent leaves; the only reliable character to distinguish these two species is apparently the behavior of the bark which, in *H. Bretschneideri*, separates the second year in thin large flakes and is of chestnut-brown color without or with few inconspicuous lenticels, while in *H. xanthoneura* the bark adheres to the branch, is conspicuously lenticellate and varies from yellowish gray to red-brown in color.

Hydrangea longipes Franchet in Nouv. Arch. Mus. Paris, sér. 2, VIII. 228 (Pl. David. II. 45) (1885).—Rehder in Sargent, Pl. Wilson. I. 33 (1913).—Hers in Jour. N. China Branch R. As. Soc. LIII. 111 (1922); Liste Ess. Lign. Honan, 11 (1922).

Hydrangea Hemsleyana Diels in Bot. Jahrb. XXIX. 376 (1900).

HONAN: Sung hsien, San kuan miao, *J. Hers*, no. 551, May 24, 1919; Lushih, Hiung eul shan, alt. 1400 m., *J. Hers*, no. 938, October 10, 1908.—See also Hers, l. c.

SHENSI: Kin quan san, *G. Giraldi*, July 10, 1897; Tai pei shan, *W. Purdom*, no. 977, 1910.—See also Diels, l. c.

DISTRIBUTION: also Hupeh, Szechuan.

Hydrangea Rosthornii Diels in Bot. Jahrb. XXIX. 374 (1900).

HONAN: Lushih, Hiung eul shan, alt. 1300 m., *J. Hers*, no. 871, October 9, 1919.

DISTRIBUTION: also Szechuan.

Hers' specimen referred here to *H. Rosthornii* may possibly be nothing but a very vigorous and more pubescent form of *H. longipes* but it certainly matches better the material of *H. Rosthornii* before me than that of *H. longipes*. As in the case of *H. Bretschneideri* and *H. xanthoneura* we have here a group of closely related very variable species namely *H. strigosa* Rehd., *H. longipes* and *H. Rosthornii*, which though very distinct in their extreme forms seem to merge into each other and are difficult to define.

Hydrangea macrophylla De Candolle, Prodr. IV. 15 (1830).—Wilson in Jour. Arnold Arb. IV. 234 (1923).

Hydrangea "Hortensie" Faber in Denkschr. Entwickel. Kiautschou, 31 (1898).

Hydrangea spec. "Hortensie" Gilg & Koehne in Bot. Jahrb. XXXIV. beibl. LXXV. 39 (1904).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 130 (1919).

SHANTUNG: cultivated (ex Faber, l. c., Gilg & Koehne, l. c., and Loesener, l. c.).

Ribes manshuricum Komarov in Act. Hort. Petrop. XXII. 437 (Fl. Mansh. II. pt. 2) (1904).—Janczewski in Mém. Soc. Phys. Hist. Nat. Genève, XXXV. 274 (Monog. Groseill.) (1907).

Ribes multiflorum γ. *mandshuricum* Maximowicz in Mél. Biol. IX. 229 (1873); in Bull. Acad. Sci. St. Pétersb. XIX. 258 (1874).

Ribes petraeum var. *mongolica* Franchet in Nouv. Arch. Mus. Paris, sér. 2, VI. 7 (Pl. David. I. 127) (1883).

Ribes multiflorum Hemsley in Jour. Linn. Soc. XXIII. 279 (1887).—Janczewski in Bot. Jahrb. XXXVI. beibl. LXXXII. 52 (1905).—Non Kitaibel.

Ribes petraeum Hemsley in Jour. Linn. Soc. XXIII. 280 (1887).—Non Wulfen.

CHILI: Weichang, *W. Purdom*, nos. 10, 81, 1910 (flowers and fruits); Hsiao Wu tai shan, *J. Hers*, no. 1473, July 14, 1921; without precise locality, *Père Chanet*, no. 53, 1919.—See also Janczewski, l. c. (1907), Maximowicz, l. c., Franchet, l. c., and Hemsley, l. c.

HONAN: Tsi yuan hsien, Tien tan shan, *J. Hers*, no. 1700, September 17, 1921 (sterile, doubtful).

SHENSI: without precise locality, *G. Giraldi*, 1897.—See also Janczewski, l. c. (1907 and 1905).

DISTRIBUTION: also Manchuria, Korea.

Ribes moupinense Franch. var. **tripartitum** Janczewski in Mém. Soc. Phys. Hist. Nat. Genève, XXXV. 300 (Monog. Groseill.) (1907).

Ribes tripartitum Batalin in Act. Hort. Petrop. XI. 488 (1890).—Bretschneider, Hist. Eur. Bot. Discov. China, 1028 (1898).

Ribes moupinense Janczewski in Bot. Jahrb. XXXVI. beibl. LXXXII. 51 (1905), quoad plantam e Shensi.—Vix Franchet.

SHENSI: *G. Giraldi* (ex Janczewski, l. c. [1907 and 1905]).

KANSU: *G. N. Potanin* (ex Batalin, l. c.).

DISTRIBUTION (of the whole species): also Hupeh, Szechuan, and Yunnan.

Ribes latifolium Janczewski in Bull. Acad. Cracovie Cl. Sci. Nat. 1906, 4 (Spec. Gen. Ribes, II.); in Mém. Soc. Phys. Hist. Nat. Genève, XXXV. 294 (1907).

CHILI: *E. Bodinier*, no. 44 (ex Janczewski, l. c. [1907]).

DISTRIBUTION: also Manchuria, Saghalin, Kurile Islands, Japan.

Ribes emodense[1] var. **urceolatum**, comb. nov.

[1] **Ribes emodense**, nom. nov.

Ribes rubrum Hooker f. & Thomson in Jour. Linn. Soc. II. 89 (1858).—Hooker f., Fl. Brit. Ind. II. 411 (1878).—Non Linnaeus.

Ribes himalense Decaisne in Jacquemont, Voy. dans l'Inde, IV. 66 (1844).—Non Royle.

Ribes himalayense Decaisne, l. c. t. 77 (1844).—Janczewski in Bot. Jahrb. XXXVI. beibl. LXXXII. 51 (1905); in Mém. Soc. Phys. Hist. Nat. Genève, XXXV. 296 (Monog. Groseill.) (1907).—Non *R. himalense* Royle.

Decaisne unfortunately adopted Royle's name for this plant and cites him as the author, though it is evident from Royle's account (Ill. Bot. Himal. 225) that he intended to give a name to the Himalayan Gooseberry of which there is only one species known later called by Decaisne *R. alpestre*. There may be doubt if Royle's name should be considered properly published and should supersede Decaisne's name for the Himalayan Gooseberry as it lacks a technical description, but it does not seem wise and is not in conformity with the Rules of Nomenclature to retain the name *R. himalense*, or *R. himalayense* as it is spelled on the plate, for the Himalayan Currant referred to *R. rubrum* by Hooker and other botanists, as it is clearly an incorrect application of Royle's name which may yet be taken up for the species generally known as *R. alpestre* Decne.

Ribes himalayense Decaisne in Jacquemont, Voy. dans l'Inde, IV. t. 77 (1844).—Janczewski in Bot. Jahrb. XXXVI. beibl. LXXXII. 51 (1905).—Non *R. himalense* Royle.

Ribes himalayense α. *Decaisnei* Janczewski in Mém. Soc. Phys. Nat. Genève, XXXV. 296 (Monog. Groseill.) (1907).

Ribes himalayense γ. *urceolatum* Janczewski, l. c. (1907); in Bull. Acad. Sci. Cracovie Cl. Sci. Nat. 1910, 69.

SHENSI: *G. Giraldi* (ex Janczewski, l. c. [1905, 1907 and 1910]).

DISTRIBUTION (of the variety): Hupeh, Yunnan, Sikkim.

Ribes emodense var. **verruculosum,** var. nov.

A typo recedit foliis minoribus subtus ad venas basin versus et in petiolo apicem versus verruculis elevatis et ascendentibus glanduliferis instructis, racemis brevioribus, floribus subsessilibus, fructibus rubris sapidis.—Frutex metralis, ramulis glabris, ramis vetustioribus cinereis: folia 5-loba, lobis elongato-triangularibus saepe duplo longioribus quam latis acuminatis dupliciter inciso-serratis, 3–5.5 cm. longa, supra glabra, subtus basi tantum in axillis venarum villosa, ad venas praecipue basin versus verruculis glanduliferis (glandulis minimis et saepe obsoletis) conspersis; petioli graciles, 1.5–3.5 cm. longi, basi sparse glanduloso-ciliati, apicem versus ut venae verruculis instructi, ceterum glabri: racemi 2.5–4 cm. longi, rhachide leviter pubescente; bracteae rotundatae vel ovatae, ciliatae, circiter 1 mm. longae; flores subsessiles vel brevissime pedicellati, sepalis ciliatis, petalis cuneiformibus glabris quam stamina paullulo brevioribus, stylo apice bifido stamina aequante: bacca globosa, vix 8 mm. diam., rubra, sapida.

CHILI: Hsiao Wu tai shan, *J. Hers*, no. 1532, July 14, 1921 (type); same locality, *F. N. Meyer*, no. 1363, August 29, 1913 (fruiting).

SHANSI: Wu chai hsien, Ta nan kow, alt. 2000 to 3000 m., *Tchuang Kieh*, Hers no. 2028, September 7, 1922; Fang shan hsien, Nan yang shan, alt. 2000 to 3000 m., *J. Hers*, no. 2706, September 22–30, 1923.

This variety seems nearest to var. *urceolatum* (Jancz.) Rehd. but differs chiefly in its lower stature, smaller leaves glabrous above and furnished on the veins beneath as on the petiole with numerous small wart-like excrescences, and in its red fruit which according to Mr. Hers is of excellent flavor and just as good as our cultivated currants. The peculiar wart-like excrescences or glands can be found occasionally though very sparingly on specimens of var. *urceolatum* and of typical *R. emodense* from the northwestern Himalaya. From the two other varieties, var. *urceolatum* which has black fruits and var. **glandulosum,** comb. nov. (*R. himalayense* var. *glandulosum* Janczewski) which has orange fruit, var. *verruculosum* is well distinguished by the color of its fruit, but the Himalayan plant is described as having at least in one form red fruits which, however, are said to be not palatable. When we have a more definite knowledge of the fruit of the Himalayan plant we may probably be able to distinguish this northern variety as a species.

Ribes Meyeri Maximowicz in Mél. Biol. IX. 232 (1873); in Bull. Acad.

Sci. St. Pétersb. XIX. 260 (1874).—Hemsley in Jour. Linn. Soc. XXIII. 279 (1887).—Bretschneider, Hist. Eur. Bot. Discov. China, 1054 (1898).

CHILI: near Peking (ex Maximowicz, l. c., Hemsley, l. c., and Bretschneider, l. c.).

DISTRIBUTION: also Central Asia to Szechuan.

I have seen no specimens from northern China and as Janczewski in his monograph does not mention it from this region its occurrence there seems doubtful.

Ribes nigrum Linnaeus, Spec. 201 (1753).—Hance in Jour. Bot. XIII. 132 (1875).—Hemsley in Jour. Linn. Soc. XXIII. 279 (1887).

? *Ribes pauciflorum* "Bge. vel affinis" Janczewski in Bot. Jahrb. XXVI. beibl. LXXXII. 51 (1905).

CHILI: Po hua shan, *E. Bretschneider* (ex Hance, l. c., and Hemsley, l. c.).

SHENSI: Kan y shan in Lao y shan, *G. Giraldi*, no. 3776 (ex Janczewski, l. c.).

DISTRIBUTION: Europe and Siberia east to Irkutsk and Tomsk.

I have seen no specimens of *R. nigrum* from northern China and it seems doubtful whether this species is found there; Janczewski in his monograph gives Siberia as the native country of *R. nigrum* var. *pauciflorum* (Turcz.) Jancz., while typical *R. nigrum* is restricted to Europe.

Ribes fasciculatum Sieb. & Zucc. var. **chinense** Maximowicz in Mél. Biol. IX. 238 (1873); in Bull. Acad. Sci. St. Pétersb. XIX. 263 (1874).—Ito in Tokyo Bot. Mag. XIV. 105 (1900).—Janczewski in Mém. Soc. Phys. Hist. Nat. Genève, XXXV. 397 (Monog. Groseill.) (1907).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 130 (1919).

Ribes fasciculatum Hemsley in Jour. Linn. Soc. XXIII. 279 (1889).—Faber in Denkschr. Entwickel. Kiautschou, 32 (1898).—Janczewski in Bot. Jahrb. XXXVI. beibl. LXXXII. 52 (1905).—Non Siebold & Zuccarini.

Ribes chifuense Hance in Jour. Bot. XIII. 36 (1875).—Franchet in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 217 (1884).

SHANTUNG: Chifu (ex Hemsley, l. c., Franchet, l. c., and Ito, l. c.); Lau shan (ex Loesener, l. c.).

NORTHERN KIANGSU: Hai chow hills, alt. 200 m., *Kang Fu Lai*, Hers no. 2288, October 8, 1922; Liu lin shan, near Hai chow, *J. Hers*, no. 609, May 5, 1921.

HONAN: Tsi yuan hsien, Tien tan shan, *J. Hers*, no. 1702, September 17, 1921 (sterile).

SHENSI: Tschan lien li, *F. N. Meyer*, no. 1925, September 17, 1914 (Herb. U. S. Dept. Agric.); Ko hou shan, pr. Tsu lu, *G. Giraldi* (ex Janczewski, l. c.).

DISTRIBUTION: also Korea and the typical form in Japan.

Ribes Maximowiczii Batalin in Act. Hort. Petrop. XI. 487 (1890).—Bretschneider, Hist. Eur. Bot. Discov. China, 1028 (1898).—Janczewski in Mém. Soc. Phys. Hist. Nat. Genève, XXXV. 473 (Monog. Groseill.) (1907).

KANSU: banks of river Lum bu, *G. N. Potanin* (ex Bata'in, l. c., Bretschneider, l. c., and Janczewski, l. c.).

DISTRIBUTION: also Szechuan.

Ribes acuminatum Wallich in Roxburgh, Fl. Ind. II. 514 (1824).—Janczewski in Bot. Jahrb. XXXVI. beibl. LXXXII. 52 (1905)

Ribes acuminatum var. γ. *minus* Janczewski in Mém. Soc. Phys. Hist. Nat. Genève, XXXV. 472 (Monog. Groseill.) (1907).

SHENSI: Hua tzo pin, *G. Giraldi* (e Janczewski l. c.

DISTRIBUTION: also Hupeh, Szechuan, Yunnan; Himalayas.

Ribes glaciale Wallich in Roxburgh, Fl. Ind. II. 513 (1824).—Janczewski in Bot. Jahrb. XXXVI. beibl. LXXXII. 51 (1905); in Mém. Soc. Phys. Hist. Nat. Genève, XXXV. 467 (Monog. Groseill.) (1907).

? *Ribes pulchellum* var. *inerme* Janczewski in Bot. Jahrb. XXXVI. beibl. LXXXII. 52 (1905).

SHENSI: Qua in san, *G. Giraldi*, July 16, 1897.—See also Janczewski, l. c. (1905 and 1907).

DISTRIBUTION: also Hupeh, Szechuan, Yunnan; Himalayas.

Ribes coeleste Janczewski in Bull. Acad. Cracovie Cl. Sci. Nat. 1906, 290 (Spec. Gen. Ribes, III. 11); in Mém. Soc. Phys. Hist. Nat. Genève, XXXV. 465 (1907).

SHENSI: Tai pei shan, *W. Purdom*, no. 975, 1910.—See also Janczewski, l. c. (1906 and 1907).

DISTRIBUTION: also Szechuan.

Ribes tenue Janczewski in Bull. Acad. Sci. Cracovie Cl. Sci. Nat. 1906, 290 (Spec. Gen. Ribes, III. 11).

SHENSI: *G. Giraldi*, no. 7159 (ex Janczewski, l. c.).

DISTRIBUTION: Hupeh, Szechuan; Tibet, Sikkim.

Ribes tricuspe Nakai, Chosenshokubutsu I. 342, f. 426 (1913); in Tokyo Bot. Mag. XXX. 142 (1916).

HONAN: Yung ning, Chuan pao shan, *J. Hers*, no. 1123, October 17, 1919; Lushih, Lao kiun shan, alt. 2000 m., *J. Hers*, no. 1171, September 21, 1919; Tsi yen hsien, Tien tan shan, *J. Hers*, no. 1718, September 20, 1921.

DISTRIBUTION: also Korea, Japan.

The specimens cited above are all sterile and I am therefore not quite sure if their identification with *R. tricuspe* is correct, but they agree perfectly well with specimens from Korea of this species and do not match any other Ribes known from northern China.

Ribes pulchellum Turczaninov in Bull. Soc. Nat. Moscou, v. 191 (1832).—Maximowicz in Mél. Biol. IX. 241 (1873); in Bull. Acad. Sci. St. Pétersb. XIX. 266 (1874).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, VI. 7 (Pl. David. I. 127) (1883).—Hemsley in Jour. Linn. Soc. XXIII. 280 (1887).—Bretschneider, Hist. Eur. Bot. Discov. China, 344 (1898).—Jan-

czewski in Mém. Soc. Phys. Hist. Nat. Genève, xxxv. 453, fig. 162 (Monog. Groseill.) (1907).

CHILI: Weichang, *W. Purdom*, no. 31, 1910; Cal-ceen wong, *W. Purdom*, no. 70, 1910; Po hua shan, *J. Hers*, no. 1663, September 9, 1921; Hsiao Wu tai shan, Shui shih tao, alt. 1500 m., *J. Hers*, no. 2179, October 8, 1922; Hsiao Wu tai shan, southeastern valley, alt. 900–1500 m., *J. Hers*, no. 2193, October 9, 1922.—See also Turczaninow, l. c., Maximowicz, l. c., Franchet, l. c., Bretschneider, l. c., and Janczewski, l. c.

SHANSI: Shara khada mountains, *N. Przewalski* (ex Maximowicz, l. c.).

DISTRIBUTION: Szechuan; Mongolia, Transbaicalia.

Ribes Giraldii Janczewski in Bull. Acad. Sci. Cracovie Cl. Sci. Nat. 1906, 289 (Spec. Gen. Ribes III. 10); in Mém. Soc. Phys. Hist. Nat. Genève, xxxv. 455, fig. 163 (Monog. Groseill.) (1907).

? *Ribes orientale* Janczewski in Bot. Jahrb. xxxvi. beibl. lxxxii. 51 (1905).

SHANSI: Hia hsien, Huang lai kow, *J. Hers*, no. 1862, October 2, 1921.

SHENSI: Tai pei shan, *W. Purdom*, no. 974, 1910.—See also Janczewski, l. c. (1906, 1907 and 1905).

Ribes bureiense Fr. Schmidt in Mém. Acad. Sci. St. Pétersb. sér. 7. xii. no. ii. 42 (1868).—Janczewski in Bot. Jahrb. xxxvi. beibl. lxxxii, 51 (1905); in Bull. Acad. Sci. Cracovie Cl. Sci. Nat. 1906, 284 (Spec. Gen. Ribes. iii. 5); in Mém. Soc. Phys. Sci. Nat. Genève, xxxv. 371, fig. 99 (Monog. Groseill.) (1907).—Hers in Jour. N. China Branch R. As. Soc. liii. 115 (1922); Liste Ess. Lign. Honan, 26 (1922).

Ribes macrocalyx Hance in Jour. Bot. xiii. 35, 132 (1875).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, vi. 6 (Pl. David. i. 127) (1883).—Bretschneider, Hist. Eur. Bot. Discov. China, 862, 1054 (1898).

Ribes grossularioides Hemsley in Jour. Linn. Soc. xxiii. 279 (1887).—Non Maximowicz.

? *Ribes alpestre* Hers, l. c. (1922).—Non Decaisne.

CHILI: Hsiao Wu tai shan, *F. N. Meyer*, no. 1333, August 23, 1913; same locality, *J. Hers*, no. 1555, July 14, 1921; Hsiao Wu tai shan, Tieh ling sze, alt. 1300 m., *J. Hers*, no. 2148, October 7, 1922.—See also Bretschneider, l. c., and Janczewski, l. c. (1906 and 1907).

HONAN: Lushih, Hiung eul shan, alt. 1400 m., *J. Hers*, no. 913, October 10, 1919; Yung ning, Chuan pao shan, alt. 1500 m., *J. Hers*, no. 1111, October 17, 1919 (both sterile).

SHANSI: Wu tai shan, alt. 1600 m., *J. Hers*, no. 2633, July 29, 1923; Wu chai hsien, Ta nan kow, alt. 2000–3000 m., *Tchuang Kieh*, Hers no. 2017, September 7, 1922; Nan yang shan, alt. 1500–2000 m., *J. Hers*, no. 2707, September 22–30, 1923.

SHENSI: "Gie ju," *G. Giraldi*, no. 3769 (ex Janczewski, l. c. [1905, 1906 and 1907]).

DISTRIBUTION: Manchuria, Korea.

In Hers' nos. 2017 and 2707 from Shansi the fruits are less spiny than in the type, some fruits bearing only 3 or 4 spines.

Ribes stenocarpum Maximowicz in Bull. Acad. Sci. St. Pétersb. XXVII. 475 (1881); in Mél. Biol. XI. 228 (1881).—Hemsley in Jour. Linn. Soc. XXIII. 280 (1887).—Bretschneider, Hist. Eur. Bot. Discov. China, 976 (1898).—Janczewski in Bot. Jahrb. XXXVI. beibl. LXXXII. 51 (1905); in Bull. Acad. Sci. Cracovie Cl. Sci. Nat. 1906, 284 (Spec. Gen. Ribes III. 5); in Mém. Soc. Phys. Sci. Nat. Genève, XXXV. 374, fig. 101 (Monog. Groseill.) (1907).

SHENSI: Tue lien pin, *G. Giraldi*, nos. 522, 523 (ex Janczewski, l. c. [1905, 1906 and 1907]).

KANSU: Tangut, *N. Przewalski* (ex Maximowicz, l. c., Hemsley, l. c., and Bretschneider, l. c.).

Ribes alpestre β. **giganteum** Janczewski in Bull. Acad. Sci. Cracovie Cl. Sci. Nat. 1910, 72.—Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds Pl. Imp. XLII. 38, 52, nos. 39916, 40022, pl. 6 (1918).

KANSU: near Tao chow, *F. N. Meyer*, no. 2011, November 25, 1914.—See also Meyer, l. c.

PITTOSPORACEAE

Pittosporum glabratum Lindley in Jour. Hort. Soc. London, I. 230 (1846).—Diels in Bot. Jahrb. XXXVI. beibl. LXXXII. 52 (1905).—Rehder & Wilson in Sargent, Pl. Wilson. III. 326 (1916).

SHENSI: "Thui kio tsuen," *G. Giraldi*, September 25, 1897.—See also Diels, l. c., and Rehder & Wilson, l. c.

DISTRIBUTION: also Kiangsi, Chekiang, Fokien, Kwangtung, Hupeh, Kweichow, Szechuan, Yunnan.

HAMAMELIDACEAE

Liquidambar formosana Hance in Ann. Sci. Nat. sér. 5, v. 215 (1866).—Bailey, Gent. Herb. I. 27 (1920).

HONAN: Chikung shan, *L. H. Bailey*, June 30, 1917.—See also Bailey, l. c.

NORTHERN KIANGSU: Liu lin shan, near Hai chow, *J. Hers*, no. 608, May 5, 1921; Hai chow hills, *Kang Fu Lai*, Hers nos. 2263 and 2264, October 8, 1922.

DISTRIBUTION: also Anwhei (Herb. Univ. Nanking, no. 1597), Chekiang, Kiangsi, Kwangtung, Hupeh, Szechuan; Formosa.

Fortunearia sinensis Rehder & Wilson in Sargent, Pl. Wilson. I. 428 (1913).—Bailey, Gent. Herb. I. 27 (1920).

HONAN: Chi kung shan, *L. H. Bailey*, June 30, 1917.—See also Bailey, l. c.

DISTRIBUTION: also Anwhei (Herb. Univ. Nanking, no. 362), Hupeh.

EUCOMMIACEAE

Eucommia ulmoides Oliver in Hooker's Icon. XX. t. 1950 (1890).—Wilson in Sargent, Pl. Wilson. I. 433 (1913).—Bailey, Gent. Herb. I. 28

(1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 110 (1922); Liste Ess. Lign. Honan, 12 (1922).

HONAN: Sung hsien, San kuan miao, alt. about 1000 m., *J. Hers*, no. 515, May 24, 1919.—See also Bailey, l. c., and Hers, l. c.

SHENSI: Ling yen tan, alt. 700 m., *J. Hers*, no. 2448, October 11, 1922.

KANSU: Hui hsien, *F. N. Meyer*, no. 1743, September 29, 1914.

DISTRIBUTION: also Hupeh, Chekiang (*F. N. Meyer*, no. 1535).

ROSACEAE

Physocarpus amurensis Maximowicz in Act. Hort. Petrop. VI. 221 (1879).—Limpricht, Bot. Reis. Hochgeb. Chin. Ost-Tib. 403 (1922).

CHILI: Jehol, Wu ling shan (ex Limpricht, l. c.).

DISTRIBUTION: also Manchuria, Korea.

Neillia sinensis Oliver in Hooker's Icon. XVI. t. 1540 (1886).—Pritzel in Bot. Jahrb. XXIX. 382 (1900).—Rehder in Sargent, Pl. Wilson. I. 436 (1913).

SHENSI: In kia po, *G. Giraldi*, June 4, 1897; Tai pei shan, *G. Giraldi*, July 20, 1897; *W. Purdom*, nos. 1, 467, 1910; Lung chow, Kuan shan, alt. 2000 m., *J. Hers*, no. 2343, July 3, 1922; Lung chow, Li kia po, alt. 1800 m., *J. Hers*, no. 2370, July 4, 1922.—See also Pritzel, l. c., and Rehder, l. c.

KANSU: Valley of the river Tshiluco, *G. N. Potanin* (ex Rehder, l. c.).

DISTRIBUTION: also Hupeh, Szechuan, Hunan.

Stephanandra chinensis Hance in Jour. Bot. XX. 210 (1882).—Hemsley in Jour. Linn. Soc. XXIII. 228 (1887).—Bailey, Gent. Herb. I. 31 (1920).

SHANTUNG: Maingay (ex Hemsley, l. c.).

HONAN: Chi kung shan, *L. H. Bailey*, June 13, 1917.—See also Bailey, l. c.

DISTRIBUTION: also Kiangsi, Hupeh.

Stephanandra incisa (Thunb.) Zabel in Garten-Zeit. IV. 510 (1885).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 131 (1919).

Stephanandra flexuosa Siebold & Zuccarini in Abh. Akad. Muench. III. 740, t. 4, fig. 2 (1843).—Gilg in Bot. Jahrb. XXXIV. beibl. LXXV. 39 (1904).

SHANTUNG: Lau shan and Cape Ya tau (ex Loesener, l. c., and Gilg, l. c.).

DISTRIBUTION: also Korea, Japan.

Spiraea prunifolia Siebold & Zuccarini, Fl. Jap. I. 131 (1835).—Pritzel in Bot. Jahrb. XXIX. 382 (1900).

SHENSI: ? Lean san, *G. Giraldi*, no. 1136 (ex Pritzel, l. c.).

DISTRIBUTION: also Kiangsu, Chekiang, Kiangsi, Fokien; Korea; Formosa.

The citation is marked with a query by Pritzel and it seems indeed doubtful that this species should occur in Shensi, as it is so far known only from Eastern China and from Korea and Formosa.

Spiraea hypericifolia Linnaeus, Spec. I. 489 (1753).—Maximowicz in

Act. Hort. Petrop. VI. 177 (1879).—Rehder in Jour. Arnold Arb. I. 258 (1920).

Spiraea hypericifolia var. *hupehensis* Rehder in Sargent, Pl. Wilson. I. 438 (1913), quoad specimen e Shensi.

CHILI: Si wan tze near Kalgan, *Père Artselaer* (ex Maximowicz, l. c.).

SHENSI: Yenan fu, *W. Purdom*, no. 346, May, 1910.—See also Rehder, l. c. (1913 and 1920).

DISTRIBUTION: also Mongolia and through Siberia to Turkestan, Caucasus and Russia.

Spiraea hypericifolia var. **thalictroides** Maximowicz in Act. Hort. Petrop. VI. 179 (1879).

CHILI: "in Mongolia versus fines Chinenses," *Kirilow* (ex Maximowicz, l. c.).

DISTRIBUTION: also Mongolia, Dahuria and Transbaicalia.

Spiraea mongolica Maximowicz in Bull. Acad. Sci. St. Pétersb. XXVII. 467 (1881); in Mél. Biol. XI. 216 (1881).—Hemsley in Jour. Linn. Soc. XXIII. 226 (1887).—Bretschneider, Hist. Eur. Bot. Discov. China, 975 (1898).

Spiraea crenifolia γ. *mongolica* Maximowicz in Act. Hort. Petrop. VI. 181 (1879).

KANSU: *N. Przewalski* (ex Maximowicz, l. c., Hemsley, l. c., and Bretschneider, l. c.).

Spiraea gemmata Zabel, Strauch. Spir. 23 (1893).—Rehder in Sargent, Pl. Wilson. I. 441 (1913).

SHENSI: Tai pei shan, *W. Purdom*, no. 2, 1910.

KANSU: Min chow, alt. 2800 m., *W. Purdom*, no. 1017, 1910.

DISTRIBUTION: also Szechuan.

Spiraea alpina Pallas, Fl. Ross. I. 35, t. 20 (1784).—Kanitz in Szechenyi, Keletazs. Utján. Tudom. Ered. II. 808 (Pl. Enum. 20) (1891); in Szechenyi, Wiss. Ergeb. Reise Ostas. II. 696 (1898).—Pritzel in Bot. Jahrb. XXIX. 382 (1900).—Rehder in Sargent, Pl. Wilson. I. 440 (1913).

SHENSI: Tai pei shan, *W. Purdom*, no. 5, 1910.—See also Pritzel, l. c., and Rehder, l. c.

KANSU: Min chow districts, alt. 3000 m., *W. Purdom*, no. 1015, 1911.—See also Kanitz, l. c., and Rehder, l. c.

DISTRIBUTION: also Szechuan; Mongolia, Dahuria, Songaria, Altai Mts.

Spiraea prostrata Maximowicz in Act. Hort. Petrop. VI. 184 (1879).—Hemsley in Jour. Linn. Soc. XXIII. 226 (1887).—Bretschneider, Hist. Eur. Bot. Discov. China, 996 (1898).—Pritzel in Bot. Jahrb. XXIX. 382 (1900).

SHENSI: along the river Han, *P. J. Piasezki* (ex Maximowicz, l. c., Hemsley, l. c., Bretschneider, l. c., and Pritzel, l. c.).

KANSU: "Kansu australis," *P. J. Piasezki* (ex Maximowicz, l. c., Hemsley, l. c., Bretschneider, l. c., and Pritzel, l. c.).

DISTRIBUTION: also Hupeh.

Spiraea media Schmidt var. **sericea** Maximowicz in Act. Hort. Petrop. VI. 189 (1879).—Hers in Jour. N. China Branch R. As. Soc. LIII. 116 (1922); Liste Ess. Lign. Honan, 30 (1922).

CHILI: Si wan tze near Kalgan, *Père Artselaer* (ex Maximowicz, l. c.).

SHANSI: Shara khada mountain, *N. Przewalski* (ex Maximowicz, l. c.).

HONAN: Teng Feng hsien, Yu tai shan, alt. 1000 m., *J. Hers*, no. 217bis, April 23, 1919 and no. 324, April 20, 1920; Yung ning, Tsi li ping, alt. 1000 m., *J. Hers*, no. 1327, September 30, 1919; Lushih, Hiung eul shan, alt. 1400 m., *J. Hers*, no. 884, October 10, 1919.—See also Hers, l. c.

DISTRIBUTION: also Manchuria, Korea, Saghalin, Mongolia, Dahuria.

Spiraea dasyantha Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. III. 97 (Enum. Pl. Chin. Bor. 23) (1833).—Walpers, Rep. II. 49 (1843).—Turczaninov in Bull. Soc. Nat. Moscou, X. no. VII. 151 (1837).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 471 (Ind. Fl. Pekin.) (1859); in Act. Hort. Petrop. VI. 194 (1879).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 259 (Pl. David. I. 107) (1883).—Hemsley in Jour. Linn. Soc. XXIII. 224 (1887).—Bretschneider, Hist. Eur. Bot. Discov. China, 332, 1053 (1898).

CHILI: "China bor." ex herb. Bunge; near Peking, *F. N. Meyer*, no. 390, May, 1907; western hills near Peking, *J. Hers*, no. 2516, June 1, 1923; Po hua shan, *J. Hers*, no. 1393, May 1, 1921; Nankow, *F. N. Meyer*, no. 1025, July 27, 1913 (Herb. U. S. Dept. Agric.); Nankow pass, *J. Hers*, no. 1605, August 15, 1921; hills near Great Wall, on Peking-Kalgan road, *J. G. Jack*, October 5, 1905; Miao feng shan, alt. 1000 m., *J. Hers*, nos. 2533, 2543, June 17 and 18, 1923; Tsing shiu tsien, *J. Hers*, no. 1638, September 6, 1921; Tung ling, *B. E. Read*, no. 77 (Herb. N. H. Cowdry, no. 2009), about 1920.—See also Bunge, l. c., Walpers, l. c., Turczaninov, l. c., Maximowicz, l. c., Franchet, l. c., and Hemsley, l. c.

Spiraea pubescens Turczaninov in Bull. Soc. Nat. Moscou, V. 190 (1832).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 471 (Ind. Fl. Pekin.) (1859); in Act. Hort. Petrop. VI. 193 (Adnot. Spir.) (1879).—Hemsley in Jour. Linn. Soc. XXIII. 227 (1887).—Bretschneider, Hist. Eur. Bot. Discov. China, 344, 1053 (1898).—Pritzel in Bot. Jahrb. XXIX. 382 (1900).—Hers in Jour. N. China Branch R. As. Soc. LIII. 116 (1922); Liste Ess. Lign. Honan, 30 (1922).

CHILI: Weichang, *W. Purdom*, no. 17, May 24, 1909, no. 1140, 1909; Tung ling mountains, *N. H. Cowdry*, no. 1336, May 18, 1921; near Kalgan, mountain ravines, *N. H. Cowdry*, no. 1362, June 2, 1921; Po hua shan, *J. Hers*, no. 1439, 1452, July 1, 1921; same locality, alt. 1000–2000 m., *J. Hers*, no. 2236, October 12, 1922; Hsiao Wu tai shan, alt. 2000 m., *F. N. Meyer*, no. 1141, August 8, 1913, *J. Hers*, no. 1505, July 14, 1921; Hsiao Wu tai shan, Thieh ling sze, alt. 1300 m., *J. Hers*, nos. 2126, 2141, October 7, 1922; Huai lai hsien, Yang kia ping, alt. 900 m., *J. Hers*, no. 2084, October 4, 1922; without precise locality, *Père Chanet*, no. 73, 1919.—

See also Turczaninov, l. c., Maximowicz, l. c., Hemsley, l. c., and Bretschneider, l. c.

HONAN: Teng feng hsien, Yu tai shan, alt. 1000 m., *J. Hers*, no. 217, April 23, 1919, no. 315, April 20, 1920; Hwei hsien, Ta fu tze, *J. Hers*, nos. 749, 779, June 16, 1919; Yung ning, Chuan pao shan, alt. 1500 m., *J. Hers*, no. 117, October 17, 1919; Tsi yuan hsien, Tien tan shan, *J. Hers*, no. 1764, September 21, 1921; Chung chow, *J. Hers*, no. 2500, May 1, 1922; Chung chow, introduced from the hills, *J. Hers*, no. 2494, April 25, 1923.—See also Hers, l. c.

SHANSI: Wu chai hsien, Ta nan kow, alt. 2000–3000 m., *Tchuang Kieh*, Hers no. 2003, September 7, 1922; Nan yang shan, alt. up to 2500 m., *J. Hers*, no. 2718, September 22–30, 1923; Shara khada mountains, *N. Przewalski* (ex Maximowicz, l. c. [1879]).

SHENSI: south of Yenan fu, *W. Purdom*, no. 358, May, 1910; King lung shan, alt. 900 m., *J. Hers*, no. 2438, October 9, 1922.—See also Pritzel, l. c.

DISTRIBUTION: also Korea.

Purdom's no. 17 from Weichang is very similar to *S. media* var. *sericea* in its leaves which on the flowering branchlets are elliptic oblong and only dentate at the apex but it shows the umbellate flowers, the upright calyx-teeth and rather shorter stamens of *S. pubescens*. Hers' nos. 749 and 779 from Hwei hsien, Honan, resemble in their firmer reticulate leaves *S. hirsuta* Bl., but the inflorescence is glabrous and the leaves are rather small.

Spiraea cantoniensis Loureiro, Fl. Cochinch. 322 (1790).—Hers in Jour. N. China Branch R. As. Soc. LIII. 116 (1922); Liste Ess. Lign. Honan, 29 (1922).

NORTHERN KIANGSU: Sukow, on the seashore, Liu lin shan, near Hai chow, *J. Hers*, no. 621, May 5, 1921.

HONAN: Yu tai shan, *J. Hers*, nos. 314, 327, April 20 and May 10, 1920; Sung shan, *J. Hers*, no. 337, April 24, 1921; Cheng chow, *J. Hers*, nos. 2496, 2501, May 1, 1923.

DISTRIBUTION: also Chekiang, Fokien, Kwangtung; Japan.

Spiraea hirsuta Schneider in Bull. Herb. Boissier, sér. 2, v. 342 (1905).—Rehder in Sargent, Pl. Wilson. I. 444 (1913).

SHENSI: Tai pei shan, *W. Purdom*, no. 4, 1910.—See also Rehder, l. c.

DISTRIBUTION: also Hupeh.

Purdom's specimen resembles *S. pubescens* Turcz. in the shape and pubescence of its leaves, but the inflorescence is pilose.

Spiraea Blumei G. Don, Gen. Syst. II. 518 (1832).—Hemsley in Jour. Linn. Soc. XXIII. 223 (1887).—Pritzel in Bot. Jahrb. XXIX. 383 (1900).—Rehder in Sargent, Pl. Wilson. I. 446 (1913).

HONAN: Sung hsien, San kuan miao, *J. Hers*, no. 122, October 2, 1919; Sung hsien, Shih tze miao, alt. 1200 m., *J. Hers*, no. 1253, September 25, 1919; Tsi yuan hsien, alt. 500 m., *J. Hers*, no. 2654, August 22, 1923;

Tsi yuan hsien, Tien tan shan, *J. Hers*, no. 1709, September 20, 1921; without precise locality, *J. Hers*, no. 16, 1918.

SHENSI: "Mte. Kin qua san," *G. Giraldi*, July 10, 1897; Tai pei shan, *W. Purdom*, no. 6, 1910 and no. 423, July 2, 1910.—See also Pritzel, l. c., and Rehder, l. c.

DISTRIBUTION: also Kiangsu, Kiangsi, Hupeh, eastern Szechuan; Japan.

This is apparently a very variable species and some specimens closely approach *S. triloba* L., particularly Purdom's nos. 6 and 423 from Shensi which resemble that species in their much smaller, thinner and glabrous leaves but the leaves are cuneate-obovate and scarcely 3-lobed.

Spiraea trilobata Linnaeus, Mant. Alt. 244 (1771).—Bunge in Mém Div. Sav. Acad. Sci. St. Pétersb. II. 97 (Enum. Pl. Chin. Bor. 23) (1833).—Turczaninov in Bull. Soc. Nat. Moscou, X. no. VII. 151 (1837).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 471 (Ind. Fl. Pekin.) (1859); in Act. Hort. Petrop. VI. 197 (Adnot. Spir.) (1879).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 259 (Pl. David. I. 107) (1883); in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 214 (Fl. Tché-foû) (1884).—Hemsley in Jour. Linn. Soc. XXIII. 228 (1887).—Bretschneider, Hist. Eur. Bot. Discov. China, 53 (1898).—Pritzel in Bot. Jahrb. XXIX. 283 (1900).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 131 (1919).—Bailey, Gent. Herb. I. 31 (1920).—Limpricht, Bot. Reis. Hochgeb. Chin. Ost.-Tib. 404 (1922).—Hers in Jour. N. China Branch R. As. Soc. LIII. 116 (1922); Liste Ess. Lign. Honan, 30 (1922).—Cowdry in Jour. N. China Branch R. As. Soc. LIII. 164 (Pl. Peitaiho) (1922).

Spiraea pubescens Gilg in Bot. Jahrb. XXXIV. beibl. LXXV. 39 (1904).—Non Turczaninov.

CHILI: Weichang, *W. Purdom*, no. 1141, 1910; Peking, western hills, *J. Hers*, nos. 1397, 1581, 1613, May 15, and August 7 and 21, 1921; San tun ying, on dry rocky slopes, *F. N. Meyer*, no. 962, May 29, 1913; Tsing shui tsien, *J. Hers*, no. 1629, September 6, 1921; Miao feng shan, alt. 1000 m., *J. Hers*, nos. 2534, 2544, June 12 and 18, 1923; "Chin. bor.," ex Herb. Bunge (Gray Herb.).—See also Bunge, l. c., Turczaninov, l. c., Maximowicz, l. c., Franchet, l. c., Hemsley, l. c., Bretschneider, l. c., Limpricht, l. c., and Cowdry, l. c.

SHANTUNG: Lau shan, alt. 300 m., *R. Zimmermann*, no. 393, 1901; Po shan, *F. N. Meyer*, no. 264, September, 1907.—See also Loesener, l. c., and Gilg, l. c.

HONAN: Lushih, Tang ho, alt. 1000 m., *J. Hers*, no. 951, October 11, 1919; Kio shan, *L. H. Bailey*, June 23, 1917.—See also Bailey, l. c., and Hers, l. c.

SHANSI: Sheng shih ling, alt. 1500 to 2500 m., *Tchuang Kieh*, Hers no. 2057, September 9, 1922; Wu tai shan, alt. 1300 m., *J. Hers*, no. 2611, July 29, 1923.

SHENSI: several localities, *G. Giraldi* (ex Pritzel, l. c.).

DISTRIBUTION: also Dahuria, Siberia, Turkestan.

Spiraea Wilsonii Duthie in Hort. Veitch, 379 (1906).—Bean in Bot. Mag. CXXXVII. t. 8399 (1911).

Spiraea canescens Pritzel in Bot. Jahrb. XXIX. 383 (1900), quoad plantam e Shensi.—Non D. Don.

SHENSI: In kia po, and Lao y san, *G. Giraldi*, June 4, 1897; Po uo li, *G. Giraldi*, July 25–30, 1897; Lao y san (Zulu), *G. Giraldi*, September 6, 1897; Tai pei shan, alt. 2300 m., *W. Purdom*, nos. 425, 426, July 1, 1910, nos. 8, 10, 1910.—See also Pritzel, l. c.

DISTRIBUTION: also Hupeh.

Spiraea longigemmis Maximowicz in Act. Hort. Petrop. VI. 205 (Adnot. Spir.) (1879).—Hemsley in Jour. Linn. Soc. XXIII. 226 (1887).—Bretschneider, Hist. Eur. Bot. Discov. China, 975 (1898).

KANSU: Min chow, *W. Purdom*, no. 1016, 1910.—See also Maximowicz, l. c., Hemsley, l. c., and Bretschneider, l. c.

Spiraea Fritschiana Schneider in Bull. Herb. Boissier, sér. 2, v. 347 (1905); Ill. Handb. Laubholzk. I. 477 (1905).—Rehder in Sargent, Pl. Wilson. I. 453 (1913).

Spiraea betulifolia Debeaux in Act. Soc. Linn. Bordeaux, XXXI. 148 (Fl. Tchéfoû, 53) (1877).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 260 (Pl. David. I. 108) (1883); in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 214 (1884).—Hemsley in Jour. Linn. Soc. XXIII. 223 (1887).—Faber, Denkschr. Entwickel. Kiautschou, 32 (1898).—Non Pallas.

Spiraea japonica Hemsley in Jour. Bot. Soc. XXIII. 225 (1887), quoad plantam e Shantung.—Palibin in Act. Hort. Petrop. XIV. 116 (1895).—Pritzel in Bot. Jahrb. XXIX. 383 (1900).—Limpricht, Bot. Ergeb. Reis. Chin. Ost-Tib. 404 (1922).—Non Thunberg.

Spiraea japonica var. *typica* Gilg in Bot. Jahrb. XXXIV. beibl. LXXV. 39 (1904).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 131 (1919).—Non *S. japonica* Thunberg.

Spiraea angulata Schneider in Bull. Herb. Boissier, sér. 2, v. 347 (1905); Ill. Handb. Laubholzk. I. 477 (1905).

Spiraea Fritschiana var. *angulata* Rehder in Sargent, Pl. Wilson. I. 453 (1913).

CHILI: near San tun ying, *F. N. Meyer*, no. 992 (13), June 2, 1913; Jehol, *A. David* (ex Franchet, l. c. [1883]), Ku pei ku, *H. Wawra* (ex Schneider, l. c.).—See also Hemsley, l. c., and Palibin, l. c.

SHANTUNG: Lau shan, *R. Zimmermann*, nos. 344, 382, 1901; Chifu, *N. H. Cowdry*, no. 584, July, 1920; Tai shan, *J. Hers*, no. 1927, June 18, 1922.—See also Schneider, l. c., Rehder, l. c., Debeaux, l. c., Franchet, l. c. (1884), Hemsley, l. c., Faber, l. c., Gilg, l. c., and Loesener, l. c.

HONAN: Yung ning, Tsi li ping, alt. 1000 m., *J. Hers*, no. 1379, September 30, 1919 (sterile).

SHENSI: Kan y san, west of Lao y san, *G. Giraldi*, June 11–12, 1897; Lao y san, *G. Giraldi*, June 4, 1897; Kin ten san, *G. Giraldi*, July 14, 1897; Ta sce tsuen, *G. Giraldi*, September 18, 1897; Tai pei shan, *W. Purdom*, nos. 1, 3, 1910.—See also Pritzel, l. c., and Limpricht, l. c.

DISTRIBUTION: also Hupeh; Manchuria, Korea.

Neither *S. betulifolia* Pall. nor *S. japonica* Thunb. seem to occur in northern China; all the specimens I have seen from the northern provinces

where these two species have been reported from turned out to be *S. Fritschiana*. As the difference between the two recognized forms of this species, the type with the leaves sparingly pubescent beneath and the var. *angulata* with the leaves quite glabrous, is very slight, I have not kept these forms separate here. The glabrous form seems to be the more common; to the pubescent type belong the following specimens: Zimmermann's no. 382 and Cowdry's no. 584 from Shantung, Hers' no. 1379 from Honan and Giraldi's specimens from Kan y san and Kin ten san, while the others belong to var. *angulata* Rehd.

Sibiraea laevigata Maxim. var. **angustata** Rehder in Sargent, Pl. Wilson. I. 455 (1913).

KANSU: Min chow, Tow River and Choni districts, alt. 3300 m., *W. Purdom*, no. 791, 1910.—See also Rehder, l. c.

DISTRIBUTION (of variety): also W. Szechuan, Yunnan (*C. Schneider*, no. 2205); (distribution of the type): southern Siberia, Altai and Tien shan, and one variety in southeastern Europe.

Sorbaria Kirilowii Maximowicz in Act. Hort. Petrop. VI. 225 (Adnot. Spir.) (1879).—Kanitz in Szechenyi, Keletazs. Utján. Tudom. Ered. II. 808 (Pl. Enum. 20) (1891); in Szechenyi, Wiss. Ergeb. Reise Ostas. II. 696 (1898).—Schneider, Ill. Handb. Laubholzk. I. 486, fig. 297 p–q, 299 d (1905).

Spiraea sorbifolia Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 97 (Enum. Pl. Chin. Bor. 23) (1833).—Turczaninov in Bull. Soc. Nat. Moscou, X. no. VII. 151 (1837).—Hemsley in Jour. Linn. Soc. XXIII. 227 (1887).—Bretschneider, Hist. Eur. Bot. Discov. China, 332 (1898).—Non Linnaeus.

Spiraea Kirilowii Regel & Tiling in Nouv. Mém. Soc. Nat. Moscou, XI. 81 (Fl. Ajan.) (1858).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 260 (Pl. David. I. 108) (1883).—Bretschneider, Hist. Eur. Bot. Discov. China, 348 (1898).

Sorbaria sorbifolia var. *Kirilowi* Ito in Tokyo Bot. Mag. XIV. 116 (1900).

Sorbaria sorbifolia Limpricht, Bot. Reis. Hochgeb. Chin. Ost-Tib. 404 (1922), quoad plantam e Chili.—Hers in Jour. N. China Branch R. As. Soc. LIII. 116 (1922); Liste Ess. Lign. Honan, 29 (1922).—Non A. Brown.

CHILI: Peking, Yuen ming huen, *H. Wawra*, no. 811; Peking, western hills, *J. Hers*, no. 1619, September 5, 1921; Hsiao Wu tai shan, *J. Hers*, nos. 1470, 1526, 1552, July 14, 1921.—See also Maximowicz, l. c., Schneider, l. c., Bunge, l. c., Turczaninov, l. c., Hemsley, l. c., Limpricht, l. c., Regel & Tiling, l. c., and Franchet, l. c.

SHANTUNG: cultivated (ex Ito, l. c.).

HONAN: Lushih, Hiung eul shan, alt. 1300 m., *J. Hers*, no. 857, October 9, 1919.—See also Hers, l. c.

SHANSI: Tun lan shui valley, alt. 1000 m., *J. Hers*, no. 2697, September 19, 1923.

SHENSI: (ex Limpricht, l. c.).

KANSU: Ala shan, cultivated (ex Maximowicz, l. c.); "in ditione Tonkerr" (ex Kanitz, l. c.).

DISTRIBUTION: Mongolia.

Sorbaria arborea Schneid. var. **glabrata** Rehder in Sargent, Pl. Wilson. I. 48 (1913).

Sorbaria sorbifolia Pritzel in Bot. Jahrb. XXIX. 384 (1900).—Non Linnaeus.
Sorbaria arborea Hers in Jour. N. China Branch R. As. Soc. LIII. 116 (1922); Liste Ess. Lign. Honan, 29 (1922).—Non forma typica Schneideri.

HONAN: Yung ning, Chuan pao shan, alt. 1500 m., *J. Hers*, no. 118, October 17, 1919; Sung hsien, San kuan miao, alt. 1000 m., *J. Hers*, no. 1323, September 27, 1919.—See also Hers, l. c.

SHENSI: Kan y san, June 11, 1897, Kan y quo (Huo kia zaez), July 8, 1897, Po uo li, July 29, 1897, Lao y san (Zu lu) September 6, 1897, Kin san, 1897, *G. Giraldi*; Tai pei shan, *W. Purdom*, no. 1039, 1910.—See also Pritzel, l. c.

KANSU: Min chow, *W. Purdom*, no. 1018, 1910.

DISTRIBUTION (of the variety): Hupeh, Szechuan, Yunnan; the typical form is common in Hupeh and Szechuan.

Purdom's no. 1018 from Kansu differs in its leaves which have only 4 to 5 pairs of smaller less long-acuminate leaflets with inconspicuously serrulate teeth and with fewer more distant veins very slightly bearded in the axils. In Kansu apparently *S. arborea* as well as *S. Kirilowii* occur, the former south of the Tsing ling shan range, the latter north of it, and I assume that the specimen collected by the Szechenyi Expedition which traversed northern Kansu belongs to *S. Kirilowii* as determined by Kanitz. These two species are not always easily distinguished without fruit; the inflorescence of *S. Kirilowii* though upright as in *S. sorbifolia* is broader and looser and approaches in this respect that of *S. arborea*, and the length of the stamens, about as long as the petals in *S. Kirilowii* and usually much longer in *S. arborea*, seems variable in the latter species. *Sorbaria sorbifolia* L. has not been found in northern China; it is a more northern species ranging from western Siberia to Kamtschatka and Saghalin.

Exochorda racemosa Rehder in Sargent, Pl. Wilson. I. 456 (1913).—Bailey, Gent. Herb. I. 28 (1920).

HONAN: Chi kung shan (ex Bailey, l. c.).

DISTRIBUTION: also Kiangsu, Chekiang.

Exochorda Giraldii Hesse in Mitt. Deutsch. Dendr. Ges. XVII. 191, 219 (1908); XVIII. 295, fig. (1909); in Fedde, Rep. Spec. Nov. VIII. 347 (1910).

Exochorda grandiflora Pritzel in Bot. Jahrb. XXIX. 384 (1900); XXXVI. beibl. LXXXII. 52 (1905).—Non Lindley.
Exochorda racemosa var. *Giraldii* Rehder in Sargent, Pl. Wilson. I. 457 (1913).
?*Exochorda racemosa* var. *Wilsonii* Farrer in Jour. Roy. Hort. Soc. XLII. 74 (1916).—Vix Rehder.

SHENSI: Kin qua san, *G. Giraldi*, July 10, 1897; Lao y san, *G. Giraldi*, 1897; Tai pei shan, *W. Purdom*, no. 1, 1910; Moutan shan, northwest of Han chang hsien, *W. Purdom*, no. 361, 1910; ? Hu kia scien, *Hugh Scallan*, 1897.—See also Rehder, l. c.

? KANSU: near Siku (ex Farrer, l. c.).

Cotoneaster horizontalis Decaisne in Fl. des Serres, XXII. 168 (1877).—Rehder & Wilson in Sargent, Pl. Wilson. I. 154 (1912).

KANSU: near Liang tang, on rocky grassy slopes, *F. N. Meyer*, no. 1675, September 29, 1914 (Herb. U. S. Dept. Agric.).

DISTRIBUTION: also Szechuan and Hupeh.

Cotoneaster horizontalis Dene. var. **perpusilla** Schneider, Ill. Handb. Laubholzk. I. 745, fig. 419e² (1906).—Rehder & Wilson in Sargent, Pl. Wilson. I. 155 (1913).

Cotoneaster microphylla Pritzel in Bot. Jahrb. XXIX. 386 (1900), pro parte.—Non Wallich.

SHENSI: Nulsei jen z, *G. Giraldi*, 1897.—See also Pritzel, l. c.

DISTRIBUTION: also Hupeh, Szechuan.

Cotoneaster adpressa Bois in Vilmorin & Bois, Frut. Vilmorin. 116, fig. (1904).—Rehder & Wilson in Sargent, Pl. Wilson. I. 155 (1913).

KANSU: Min chow, *W. Purdom*, alt. 2800 m., no. 1033, 1910; Tao chow district, alt. 3000 m., *W. Purdom*, no. 1133, 1910.

DISTRIBUTION: also Szechuan and Kukunor region.

Cotoneaster Zabelii Schneider, Ill. Handb. Laubholzk. I. 748, fig. 420-f–h (1906).—Rehder & Wilson in Sargent, Pl. Wilson. I. 166 (1913).—Hers in Jour. N. China Branch R. As. Soc. LIII. 109 (1922); Liste Ess. Lign. Honan, 9 (1922).

Cotoneaster vulgaris Pritzel in Bot. Jahrb. XXIX. 385 (1900).—Non Lindley.

Cotoneaster racemiflora var. *Veitchii* Hers in Jour. N. China Branch R. As. Soc. LIII. 109 (1922); Liste Ess. Lign. Honan, 9 (1922).—Non Rehder & Wilson.

HONAN: Lushih, Hiung eul shan, alt. 1400 m., *J. Hers*, nos. 883, 911, 915, October 10, 1919; Lushih, Kiao ho, alt. 1000 m., *J. Hers*, no. 969, October 13, 1919; Lushih, Lao kiun shan, alt. 2000 m., *J. Hers*, no. 1194, September 21, 1919; Sung hsien, Shih tze miao, alt. 1200 m., *J. Hers*, no. 1279, September 25, 1919; Yung ning, Tsi li ping, alt. 1000 m., *J. Hers*, no. 1328, September 30, 1919; Yung ning, Yo tze ping, alt. 1000 m., *J. Hers*, no. 830, October 4, 1919; Yu tai shan, *J. Hers*, no. 328, May, 1920; Hwei hsien, Shansi border, *J. Hers*, nos. 710, 758, June 19, 1919; Sung shan, *J. Hers*, no. 339, May 1, 1921.—See also Hers, l. c.

SHENSI: Kin qua san, *G. Giraldi*, July 10, 1897; Kan y san, *G. Giraldi*, 1897; Tai pei shan, *W. Purdom*, no. 1001, 1910; northwest of Han chung hsien, *W. Purdom*, no. 360, May 30, 1910.—See also Diels, l. c.

Hers no. 710 from Hwei hsien differs from the other specimens in its small broadly oval to suborbicular leaves measuring not more than 1 cm. in length except a few on a vigorous shoot which are up to 1.5 cm. long.

Cotoneaster foveolata Rehder & Wilson in Sargent, Pl. Wilson. I. 162 (1913).

SHENSI: Lung chow, Li kia po, alt. 1400 m., *J. Hers*, no. 2382, July 4, 1922 (flowering specimen).

DISTRIBUTION: also Hupeh.

Without fruit the identification of the specimen cannot be considered final, but it agrees in its characters well with specimens from Hupeh.

Cotoneaster acutifolia Turczaninow in Bull. Soc. Nat. Moscou, v. 190 (1832).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 471 (Ind. Fl. Pekin.) (1859).—Rehder & Wilson in Sargent, Pl. Wilson. I. 158 (1913).—Hers in Jour. N. China Branch R. As. Soc. LIII. 109 (1922); Liste Ess. Lign. Honan, 9 (1922).

Cotoneaster acutifolia var. *pekinensis* Koehne, Deutsche Dendr. 158 (1893).

Cotoneaster moupinensis F. N. Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds Pl. Imp. XXXVII. 59, no. 36739 (1916).—Non Franchet.

Cotoneaster sp. F. N. Meyer, l. c. XLIII. 73, no. 40730 (1918).

Cotoneaster acutifolia var. *villosula* Hers in Jour. N. China Branch R. As. Soc. LIII. 109 (1922); Liste Ess. Lign. Honan, 9 (1922).—Non Rehder & Wilson.

CHILI: Po hua shan, *J. Hers*, no. 1454, July 1, 1921; Hsiao Wu tai shan, alt. 1600–2000 m., *F. N. Meyer*, no. 1263, August 21, 1913; *J. Hers*, nos. 1516, 1525, July 14, 1921; Hsiao Wu tai shan, Tieh ling sze, alt. 1300 m., *J. Hers*, nos. 2119, 2145, October 7, 1922; without precise locality, *Père Chanet*, no. 85, 1919.—See also Turczaninov, l. c., Maximowicz, l. c., and Meyer, l. c. (1916).

HONAN: Lushih, Hiung eul shan, alt. 1400 m., *J. Hers*, nos. 905, 923, October 10, 1919; Lushih, Lao kiun shan, alt. 2000 m., *J. Hers*, no. 1173, September 21, 1919; Sung hsien, Shih tze miao, alt. 1200 m., *J. Hers*, no. 1293, September 25, 1919; Tsi yuan hsien, Tien tan shan, *J. Hers*, nos. 1887, 1888, September 21, 1921.—See also Hers, l. c.

SHANSI: Wu chai hsien, Ta nan kow, alt. 2000–3000 m., *Tchuang Kieh*, Hers no. 2007, September 7, 1922; Wu tai shan, alt. 1600 m., *J. Hers*, no. 2616, July 29, 1923; Nan yang shan, alt. 1500–2500 m., *J. Hers*, no. 2713, September 22–30, 1923.

KANSU: Fu arr yei, *F. N. Meyer*, no. 1978, October 7, 1914 (Herb. U. S. Dept. Agric.); near Kagoba, *F. N. Meyer*, no. 2255[a], November 1, 1914 (seeds only; plants under S. P. I. no. 40730 growing at Bell, Maryland; in Herb. U. S. Dept. Agric.).—See also Meyer, l. c. (1918).

Cotoneaster acutifolia var. **villosula** Rehder & Wilson in Sargent, Pl. Wilson. I. 158 (1913).

SHENSI: "Lao y san presso Zu lu," *G. Giraldi*, June 4, 1897, Kia tan san, *G. Giraldi*, July 14, 1897; Tai pei shan, *W. Purdom*, no. 1115, 1910; northwest of Han chung hsien, *W. Purdom*, no. 367, 1910.

DISTRIBUTION: also Hupeh and Szechuan.

Cotoneaster melanocarpa Loddiges, Bot. Cab. XVI. t. 1531 (1829).

Cotoneaster sp. F. N. Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds Pl. Imp. XXXVII. 59, no. 36740 (1916).

CHILI: Hsiao Wu tai shan, alt. above 2600 m., *F. N. Meyer*, no. 1344, August 23, 1913.—See also Meyer, l. c.

DISTRIBUTION: also northern and eastern Europe to the Caucasus, and Turkestan and through Siberia to Manchuria.

Cotoneaster gracilis Rehder & Wilson in Sargent, Pl. Wilson. I. 167 (1913).

Cotoneaster nummularius Pritzel in Bot. Jahrb. XXXVI. beibl. LXXXII. 52 (1905).—Vix Fischer & Meyer.

SHENSI: Tai pei shan, *W. Purdom*, no. 1002, 1910.—See also Rehder & Wilson, l. c., and Pritzel, l. c.

KANSU: Yan pu ko, *F. N. Meyer*, no. 1965, October 6, 1914 (Herb. U. S. Dept. Agric.).

DISTRIBUTION: also Hupeh and Szechuan.

Cotoneaster racemiflora K. Koch var. **soongarica** Schneider, Handb. Laubholzk I. 754, fig. 424i (1906).

HONAN: Cheng chow, cultivated, introduced from the hills, *J. Hers*, nos. 2498, 2581, May 1 and August 2, 1923; Teng feng hsien, Yu tai shan, alt. 600 m., *J. Hers*, nos. 205, 206, April 23, 1919.

SHANSI: mountains near Tsin ke, *F. N. Meyer*, no. 404, May, 1907; Lin hsien, Nan yang shan, alt. 2000–3000 m., *Tchuang Kieh*, Hers no. 2069, September 11, 1922.

DISTRIBUTION: also Szechuan and Yunnan; Turkestan to Songaria.

The identification of the specimens cited above is open to doubt; the pubescence of the leaves and of the inflorescence is rather slight and the leaves are more or less acute or acutish but less so in no. 2069. The specimens from Cheng chow are in flower and in fruit and no. 2069 from Shansi is in fruit but the other specimens are very young with small flower buds.

Cotoneaster racemiflora var. **microcarpa** Rehder & Wilson in Sargent, Pl. Wilson. I. 169 (1913).

KANSU: Tsing chow, alt. 1400 m., *J. Hers*, no. 2406, July 21, 1922.

DISTRIBUTION: also Szechuan.

The Kansu plant agrees exactly with the type specimen except that the leaves are somewhat larger, up to 2 cm. on the fruiting branchlets and up to 3 cm. on the shoot.

Cotoneaster multiflora Bunge in Ledebour, Fl. Alt. II. 220 (1830).—Rehder & Wilson in Sargent, Pl. Wilson. I. 170 (1913).—Hers in Jour. N. China Branch R. As. Soc. LIII. 109 (1922); Liste Ess. Lign. Honan, 9 (1922).

Cotoneaster reflexa Carrière in Rev. Hort. 1870–71, 520.—Bretschneider, Hist. Eur. Bot. Discov. China, 830 (1898).

Cotoneaster sp. F. N. Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds Pl. Imp. XXXVII. 59, no. 36738 (1916).

CHILI: east of Weichang, *W. Purdom*, no. 1003, 1909; Hsiao Wu tai shan, alt. 1700 m., *F. N. Meyer*, no. 1259, August 21, 1913; *J. Hers*, nos. 1522, 1529, July 14, 1921; Huai lai hsien, Liu shu chwang, alt. 800 m., *J. Hers*, no. 2081, October 3, 1922.—See also Rehder & Wilson, l. c., and Meyer, l. c.

HONAN: Teng feng hsien, Yu tai shan, alt. 800 m., *J. Hers*, nos. 298,

June 7, 1919 and no. 2787, September 27, 1923; Lushih, Hiung eul shan, alt. 1400 m., *J. Hers*, no. 885, October 10, 1919; Yung ning, Tsi li ping, about 1100 m., *J. Hers*, nos. 401, 1358, May 22, and September 30, 1919.—See also Hers, l. c.

SHANSI: Wu chai hsien, Ta nan kow, alt. 2000–3000 m., *Tchuang Kieh*, Hers no. 2005, September 7, 1922; Sheng shih ling, alt. 1500–2500 m., *Tchuang Kieh*, Hers no. 2061, September 9, 1922; Nan yang shan, alt. 1000–2200 m., *J. Hers*, no. 2719, September 22–30, 1923; Wen ju ho valley, alt. 1200 m., *J. Hers*, no. 2815, October 2, 1923.

SHENSI: Yenan fu, *W. Purdom*, nos. 1004, 1005, 1006, 1910; northwest of Han cheng hsien, *W. Purdom*, no. 1007, 1910; near Tchan hen li, alt. 1300 m., *F. N. Meyer*, no. 1924, September 17, 1914 (Herb. U. S. Dept. Agric.); Lung chow, Li kia po, alt. 1400 m., *J. Hers*, nos. 2373, 2387, July 4, 1922.

Cotoneaster multiflora var. **calocarpa** Rehder & Wilson in Sargent, Pl. Wilson. I. 170 (1913).

KANSU: Min chow, *W. Purdom*, no. 1032, 1910; Hung pi hsien, *J. Hers*, no. 2419, August 2, 1922.

DISTRIBUTION: also Szechuan.

This variety differs from the type only in its larger narrower leaves more attenuate at the apex and some specimens enumerated under the type approach this variety rather closely as Hers' no. 2081 from Chili and nos. 2373 and 2378 from western Shensi.

Cotoneaster Dammeri var. **radicans** Schneider, Ill. Handb. Laubholzk. I. 760, fig. 428a–b (1906).—Rehder & Wilson in Sargent, Pl. Wilson. I. 176 (1912).—Farrer in Jour. Roy. Hort. Soc. XLII. 67 (1916).

KANSU: near Siku (ex Farrer, l. c.).

DISTRIBUTION: also Szechuan.

Pyracantha crenulata Roem. var. **kansuensis** Rehder in Jour. Arnold Arb. IV. 114 (1923).

Pyracantha crenulata F. N. Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds Pl. Imp. XLIII. 73, no. 40736 (1918).—Non Roemer.

KANSU: near Yau pu ko, *F. N. Meyer*, no. 1784, October 6, 1914.—See also Rehder, l. c., and Meyer, l. c.

Pyracantha Gibbsii A. B. Jackson in Gard. Chron. ser. 3, LX. 309, fig. 133_3, and 134 (1916).

? *Cotoneaster Pyracantha* Pritzel in Bot. Jahrb. XXIX. 386 (1900).—Non Spach.

? *Cotoneaster crenulata* Farrer in Jour. Roy. Hort. Soc. XLII. 68 (1916).—Non Roxburgh.

? SHENSI: (ex Pritzel, l. c.).

KANSU: near Hui hsien, *F. N. Meyer*, no. 1742, September 26, 1914.—See also Farrer, l. c.

DISTRIBUTION: also Hupeh, Szechuan, Yunnan, Hunan.

I have seen no specimens from Shensi, but I have little doubt that

Pritzel's *Cotoneaster Pyracantha* is referable rather to *P. Gibbsii* which has a wide distribution than to *P. discolor* Rehd. known so far only from Hupeh and Kweichou and more different in its general appearance from *P. coccinea* Roem. (*Cotoneaster Pyracantha* Spach) than *P. Gibbsii*.

Crataegus cuneata Siebold & Zuccarini in Abh. Akad. Muench. IV. 2, 130 (Fl. Jap. Fam. Nat. I. 22) (1846).—Bailey, Gent. Herb. I. 179 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 109 (1922); Liste Ess. Lign. Honan, 10 (1922).

NORTHERN KIANGSU: Liu lin shan, near Hai chow, alt. about 200 m., *J. Hers*, nos. 612, 657, May 5, 1921; Hai chow hills, alt. 200 m., *Kang Fu Lai*, Hers no. 2292, October 8, 1922; without precise locality, *J. Hers*, no. 1012, 1919.

HONAN: Hwei hsien, Ta fu sze, *J. Hers*, no. 752, June 16, 1919; Tsi yuan Hsien, Tien tan shan, *J. Hers*, no. 1754, September 21, 1921.—See also Bailey, l. c., and Hers, l. c.

DISTRIBUTION: also Kiangsi, Chekiang, Fokien, Hupeh, Kweichou (*Handel-Mazzetti*, nos. 10469, 10770); southern Japan.

Crataegus hupehensis Sargent, Pl. Wilson. I. 179 (1913).—Bailey, Gent. Herb. I. 28 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 109 (1922); Liste Ess. Lign. Honan, 10 (1922).

HONAN: Teng feng hsien, Yu tai shan, *J. Hers*, nos. 231, 288, April 23 and June 17, 1919, no. 321, April 20, 1920; Sung hsien, San kuan miao, alt. about 1200 m., *J. Hers*, no. 545, May 24, 1919; Lushih, Hiung eul shan, alt. 1400 m., *J. Hers*, no. 904, October 10, 1919; Lushih, Kiao ho, alt. 1000 m., *J. Hers*, no. 966, October 12, 1919; Tsi yuan hsien, alt. 500 m., *J. Hers*, no. 2663, August 23, 1923; Tsi yuen hsien, Tien tan shan, *J. Hers*, nos. 1729, 1897, September 21, 1921; Yung ning, Tsi li ping, alt. 1000 m., *J. Hers*, nos. 481, 1332, 1369, May 22 and September 30, 1919; Lao kiun shan, alt. 900 m., *J. Hers*, no. 1233, September 23, 1919; Chikung shan, *L. H. Bailey*, June 19 and 30, 1917.—See also Bailey, l. c., and Hers, l. c.

DISTRIBUTION: also Kiangsi, Chekiang, Hupeh.

Craetaegus Wilsonii Sargent, Pl. Wilson. I. 180 (1913).

HONAN: Sung hsien, Shih tze miao, alt. 1200 m., *J. Hers*, no. 1263, September 25, 1919; Lushih, Hiung eul shan, alt. 1400 m., *J. Hers*, no. 942, October 10, 1919; Yung ning, Tsi li ping, alt. 1000 m., *J. Hers*, no. 1378, September 30, 1919 (sterile).

DISTRIBUTION: also Hupeh.

Craetaegus dsungarica Lange, Rev. Spec. Gen. Crataegi, 43 (1897).—Sargent, Pl. Wilson. I. 183 (1913).

SHANTUNG: Lau shan, *F. N. Meyer*, no. 285, August, 1907 (sterile).—See also Sargent, l. c.

DISTRIBUTION: also eastern Siberia.

Another specimen from Shantung, also sterile, collected by F. N. Meyer on the Po shan (No. 260, September, 1897) resembles *C. sanguinea* Pall., but without fruit a definite determination is not possible.

Crataegus Wattiana Hemsley & Lace in Jour. Linn. Soc. XVIII. 323, t. 40 (1891).—Bean in Bot. Mag. CXLV. t. 8818 (1919).

? *Crataegus Oxyacantha* Kanitz in Szechenyi, Keletazs. Utján. Tudom. Ered. II. 810 (Pl. Enum. 22) (1891); in Szechenyi, Wiss. Ergeb. Reis. Ostas. II. 699 (1898).—Non Linnaeus.

CHILI: Hsiao Wu tai shan, Tieh ling sze, alt. 1300 m., *J. Hers*, no. 2118, October 7, 1922.

SHANSI: Wu chai hsien, Ta nan kow, alt. 2000–3000 m., *Tchuang Kieh*, Hers no. 2019, September 7, 1922; Nan yang shan, alt. 1500–2500 m., *J. Hers*, no. 2725, September 22–30, 1923.

SHENSI: Kin tan san, *G. Giraldi*, July 14, 1897; Thui kio tsuen, *G. Giraldi*, September 25, 1897; Lao y san, *G. Giraldi*, 1897; Lung chow, Ki kia po, alt. 1400 m., *J. Hers*, no. 2383, July 4, 1922.

KANSU: Pelung mountains (brought in by Tibetans), *W. Purdom*, no. 1134, 1910; Chi shan, near Cheng hsien, *F. N. Meyer*, no. 1747, October 1, 1914 (Herb. U. S. Dept. Agric.).

DISTRIBUTION: also Beluchistan to Altai mountains.

The Crataegus enumerated by Kanitz as *Crataegus oxyacantha* is possibly this species, as it is the only Crataegus known from this region.

Crataegus pinnatifida Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 100 (Enum. Pl. Chin. Bor. 26) (1833).—Walpers, Rep. II. 58 (1843).—Turczaninov in Bull. Soc. Nat. Moscou, X. no. VII. 151 (1837).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 471 (Ind. Fl. Pekin.) (1859).—Hance in Jour. Bot. VIII. 313 (1870).—Debeaux in Act. Soc. Linn. Bordeaux, XXXI. 154 (Fl. Tché-foû, 59) (1876).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 270 (Pl. David. I. 118) (1883); in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 216 (Cat. Pl. Tché-foû) (1884).—Palibin in Act. Hort. Petrop. XIV. 118 (1895).—Bretschneider, Hist. Eur. Bot. Discov. China, 333 (1898).—Faber in Denkschr. Entwickel. Kiautschou, 32 (1898).—Sargent, Pl. Wilson. I. 182 (1913).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 113 (1919).—Limpricht, Bot. Reis. Hochgeb. Chin. Ost.-Tib. 405 (1922).—Hers in Jour. N. China Branch R. As. Soc. LIII. 109 (1922); Liste Ess. Lign. Honan, 10 (1922).

Mespilus pinnatifida K. Koch, Dendr. I. 152 (1869).—Ito in Tokyo Bot. Mag. XIV. 129 (1900).

Crataegus monogyna Gilg in Bot. Jahrb. XXXIV. beibl. LXXV. 39 (1904).—Non Jacquin.

Crataegus sp. F. N. Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds Pl. Imp. XV. 17, no. 22607 (1909).

CHILI: Weichang, *W. Purdom*, nos. 57, 1116, 1909; near Peking, western hills, *Warburg*, no. 6629; Lau shan, *F. N. Meyer*, no. 854a, December 3, 1907 (seeds only; plants under no. 22687 grown at Chico [Herb. U. S. Dept. Agric.]); Po hua shan, *J. Hers*, no. 1409, May 1, 1921; Hsiao Wu

tai shan, alt. 1700 m., *F. N. Meyer*, no. 1157, August 8, 1913; *J. Hers*, nos. 1507, 1521, 1567, July 14 and 16, 1921 (sterile).—See also Bunge, l. c., Walpers, l. c., Turczaninov, l. c., Maximowicz, l. c., Hance, l. c., Franchet, l. c. (1883), Bretschneider, l. c., Sargent, l. c., Limpricht, l. c., and Meyer, l. c.

SHANTUNG: Chifu, cultivated, *C. S. Sargent*, September 22, 1903; Po shan, *F. N. Meyer*, no. 260, September, 1907 (sterile; Herb. U. S. Dept. Agric.).—See also Debeaux, l. c., Franchet, l. c. (1884), Faber, l. c., Loesener, l. c, and Gilg, l. c.

NORTH KIANGSU: Liu lin shan, near Haichow, *J. Hers*, no. 647, May 5, 1921.

HONAN: Hwei hsien, Ping lo, *J. Hers*, no. 734, June 17, 1919.—See also Hers, l. c.

DISTRIBUTION: also Manchuria and Korea.

Crataegus pinnatifida var. **major** N. E. Brown in Gard. Chron. n. sér. XXVI. 621, fig. 121 (1886).—Sargent, Pl. Wilson. I. 182 (1913).

Crataegus pinnatifida Bretschneider, Hist. Eur. Bot. Discov. China, 105 (1898).—Vix Bunge.

CHILI: Nankow, cultivated, *J. G. Jack*, October 6, 1905 (fruiting branch); Peking, purchased from street vender, *F. N. Meyer*, no. 1337, April 22, 1913; Miao feng shan, alt. 1000 m., cultivated, *J. Hers*, no. 2536, June 17, 1923.—See also Sargent, l. c., Bretschneider, l. c.,

HONAN: Hwei hsien, Pei yao, *J. Hers*, no. 732, June 18, 1919; Cheng chow, cultivated, *J. Hers*, no. 92, May 10, 1920; Honan plain, cultivated, *J. Hers*, no. 338, April 24, 1921.

Osteomeles Schwerinae Schneider, Ill. Handb. Laubholzk. I. 762, fig. 430m, 431o–r (1906).—Wilson in Sargent, Pl. Wilson. I. 184 (1912).

Osteomeles sp. Farrer in Jour. Roy. Hort. Soc. XLII. 87 (1916).

KANSU: near Siku (ex Farrer, l. c.).

There can be hardly any doubt that Farrer's plant belongs to *Osteomeles Schwerinae*, the only species of that genus known from western China.

Sorbus discolor Hedlund in Kongl. Svenska Vetensk.-Akad. Handl. XXXV. 37 (Monog. Sorbus) (1901).—Schneider, Ill. Handb. Laubholzk. I. 669, fig. 366l–m, 367g (1906).—Koehne in Sargent, Pl. Wilson. I. 480 (1913).

Pyrus discolor Maximowicz in Mém. Div. Sav. Acad. St. Pétersb. IX. 103 (Prim. Fl. Amur.), 471 (Ind. Fl. Pekin.) (1859).

Pyrus Aucuparia Maximowicz in Bull. Acad. Sci. St. Pétersb. XIX. 173 (1873); in Mél. Biol. IX. 170 (1873), pro parte.—Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 273 (Pl. David. I. 120) (1883).—Hemsley in Jour. Linn. Soc. XXIII. 255 (1887), pro parte.—? Kanitz in Szechenyi, Keletazs. Utján. Tudom. Ered. II. 810 (Enum. Pl. 22) (1891); in Szechenyi, Wiss. Ergeb. Reise Ostas. II. 699 (1898).—Non Linnaeus.

Sorbus pekinensis Koehne in Gartenfl. L. 406 (1901); in Sargent, Pl. Wilson. I. 481 (1913).

CHILI: Hsiao Wu tai shan, Tieh ling sze, alt. 1300 m., *J. Hers*, no. 2125, October 7, 1922; Hsiao Wu tai shan, Shui shih tao, alt. 1500 m.,

J. Hers, no. 2172, October 8, 1922; without precise locality, *Père Chanet*, nos. 78, 87, 1919.—See also Hedlund, l. c., Schneider, l. c., Koehne, l. c., Maximowicz, l. c., Franchet, l. c., and Hemsley, l. c.

HONAN: Lu shih, Lao kiun shan, alt. 2000 m., *J. Hers*, no. 1205, September 21, 1919; Tsi yuan hsien, Tien tan shan, *J. Hers*, nos. 1794, 1800, September 21, 1921; Teng feng hsien, Yu tai shan, alt. 800 m., *J. Hers*, no. 2785, September 27, 1923.

SHANSI: Nan yang shan, alt. 1500 to 2500 m., *J. Hers*, no. 2715, September 22–30, 1923; Yo yang hsien, alt. about 800 m., *J. Hers*, no. 2471, December 16, 1922 (leafless branches).

? SHENSI: Lung chow, Kuan shan, *J. Hers*, no. 2357, July 3, 1922 (sterile).

? KANSU: "Kumbum" (ex Kanitz, l. c.).

This species seems rather variable in the shape and size of the leaflets; no. 2715 from Shansi has narrow-lanceolate long-acuminate leaflets 4–8 cm. long, while in the specimens from Honan the leaflets are generally narrow-oblong, acute, scarcely acuminate and 2–4 cm. long. I have doubtfully referred to this species the plant from northwestern Kansu determined by Kanitz as *Pirus Aucuparia* as it is more likely to be identical with this northern species than with the more southern *S. hupehensis* found in Kansu south of the Tsin ling shan range.

Sorbus pohuashanensis Hedlund in Kongl. Svenska Vetensk.-Akad. Handl. XXXV. 33 (Monog. Sorbus) (1901).—Rehder in Mitt. Deutsch. Dendr. Ges. XV. 56 (1901).—Koehne in Sargent, Pl. Wilson. I. 481 (1913).

Pyrus pohuashanensis Hance in Jour. Bot. XIII. 132 (1875).

Pyrus Aucuparia Hemsley in Jour. Linn. Soc. XXIII. 255 (1887), quoad specimen e Pohuashan.—Non Linnaeus.

Sorbus sp. Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds Pl. Imp. XXXVII. 58, no. 36730 (1916).

CHILI: Weichang, *W. Purdom*, no. 18, May 31, 1909 and no. 47, 1909 (all sterile); Hsiao Wu tai shan, *F. N. Meyer*, no. 1241, August 20, 1913; *J. Hers*, nos. 1512, 1531, 1549, July 14, 1921 (sterile).—See also Hedlund, l. c., Rehder, l. c., Koehne, l. c., Hemsley, l. c., Hance, l. c., and Meyer, l. c.

SHANSI: Wu tai shan, alt. 1600 m., *J. Hers*, no. 2623, July 29, 1923; Wu chai hsien, Ta nan kow, alt. 2000 to 3000 m., *Tchuang Kieh*, Hers no. 2010, September 7, 1922.

In some specimens as in Meyer's no. 1241 and in no. 2010 from Shansi the leaflets are glabrous or nearly so and mostly entire below the middle and the stipules are wanting on two of the three fruiting branches seen.

Sorbus Giraldiana Schneider, Ill. Handb. Laubholzk. I. 672, fig. 369a (1906).—Koehne in Sargent, Pl. Wilson. I. 481 (1913).

SHENSI: Ngo san, *G. Giraldi*, no. 5128 (ex Schneider, l. c., and Koehne, l. c.).

Sorbus tapashana Schneider in Bull. Herb. Boissier, sér. 2, VI. 313 (1906); Ill. Handb. Laubholzk. I. 672, fig. 369b (1906).—Koehne in Sargent, Pl. Wilson. I. 482 (1913).

Pirus Aucuparia Pritzel in Bot. Jahrb. xxix. 387 (1900), pro parte.—Non Linnaeus.

SHENSI: Tai pei shan, *G. Giraldi* (ex Schneider, l. c., Koehne, l. c., and Pritzel, l. c.).

Sorbus hupehensis Schneider in Bull. Herb. Boissier, sér. 2, vi. 316 (1906); Ill. Handb. Laubholzk. i. 680, fig. 374r, 375n (1906).—Hers in Jour. N. China Branch R. As. Soc. liii. 116 (1922).

HONAN: Fu niu shan, alt. about 2000 m., *J. Hers*, no. 140, October 6, 1918.—See also Hers, l. c.

KANSU: Min chow, *W. Purdom*, no. 1034, 1910.

DISTRIBUTION: also Hupeh, Szechuan, Yunnan.

The Honan specimen which is in fruit is doubtful; it may belong to *S. discolor* Hedl. but without having seen flowering material of the Honan plant of either of these two species, I am not certain, if both species occur in that province, or if all the material belongs to one species.

Sorbus hupehensis var. **aperta** Schneider in Bot. Gaz. lxiii. 403 (1917).

Pirus Aucuparia Pritzel in Bot. Jahrb. xxix. 387 (1900), pro parte.—Non Linnaeus.

Sorbus aperta Koehne in Sargent, Pl. Wilson. i. 465 (1913).

SHENSI: Ta sce tsuen, *G. Giraldi*, September 18, 1897.—See also Pritzel, l. c., and Koehne, l. c.

KANSU: Chi shan, near Cheng hsien, *F. N. Meyer*, no. 1756, October 1, 1914.

DISTRIBUTION: also Hupeh.

Sorbus Koehneana Schneider in Bull. Herb. Boissier, sér. 2, vi. 316 (1906); Ill. Handb. Laubholzk. i. 681, fig. 374o (1906).—Koehne in Sargent, Pl. Wilson. i. 471 (1913).—Hers in Jour. N. China Branch R. As. Soc. liii. 116 (1922); Liste Ess. Lign. Honan, 29 (1922).

Pirus microphylla Pritzel in Bot. Jahrb. xxix. 387 (1900).—Non Wallich.

HONAN: Lushih, Lao kiun shan, alt. 2000 m., *J. Hers*, no. 1206, September 21, 1919.—See also Hers, l. c.

SHENSI: "Kian sian," *G. Giraldi*, August 4, 1897; Tai pei shan, *W. Purdom*, nos. 4, 1008, 1910—See also Koehne, l. c., and Pritzel, l. c.

KANSU: western Kansu (brought in by Tibetans from over the border), *W. Purdom*, no. 1121, 1910.

DISTRIBUTION: also Hupeh.

Sorbus alnifolia K. Koch in Ann. Mus. Lugd.-Bat. i. 249 (1864).—Rehder in Sargent, Pl. Wilson. ii. 270 (1915).—Hers in Jour. N. China Branch R. As. Soc. liii. 116 (1922); Liste Ess. Lign. Honan, 29 (1922).

Micromeles alnifolia Koehne, Gatt. Pomac. 21 (1890).—Loesener in Bot. Centralbl. Beih. xxxvii. abt. ii. 132 (1919).

Micromeles alnifolia var. *tiliaefolia* Schneider, Ill. Handb. Laubholzk. i. 703, fig. 386e (1906).—Loesener in Bot. Centralbl. Beih. xxxvii. abt. ii. 132 (1919).

SHANTUNG: Lau shan and Cape Ya tau (ex Loesener, l. c.).

HONAN: Teng feng, Yu tai shan, *J. Hers*, nos. 297, 297bis, June 17,

1919; same locality, alt. 800 m., *J. Hers*, no. 2786, September 27, 1923; Lushih, Hung eul shan, alt. 1400 m., *J. Hers*, nos. 901, 912, October 10, 1919; Lushih, Lao kiun shan, alt. 2000 m., *J. Hers*, no. 1160, September 21, 1919; Sung hsien, San kuan miao, alt. 1000 m., *J. Hers*, no. 1307, September 27, 1919; Tsi yuan hsien, alt. 500 m., *J. Hers*, no. 2667, August 23, 1923; Tsi yuan hsien, Tien tan shan, *J. Hers*, nos. 1771, 1773, September 21, 1921; Tsi yuan hsien, Pei teng shan, alt. 1200 m., *J. Hers*, no. 2799, October 10, 1923.—See also Hers, l. c.

SHENSI: Lung chow, Kuan shan, alt. 2000 m., *J. Hers*, no. 2350, July 3, 1922.

DISTRIBUTION: also Hupeh; Korea, Japan.

Sorbus Folgneri Rehder in Sargent, Pl. Wilson. II. 271 (1915).—Hers in Jour. N. China Branch R. As. Soc. LIII. 116 (1922); Liste Ess. Lign. Honan, 29 (1922).

Pirus Aria Pritzel in Bot. Jahrb. XXIX. 387 (1900).—Non Linnaeus.

HONAN: Chuan pao shan, alt. 1500 m., *J. Hers*, no. 1105, October 17, 1919.—See also Hers, l. c.

SHENSI: Ling yen tan, alt. 700 m., *J. Hers*, no. 2447, October 11, 1922.—See also Pritzel, l. c.

DISTRIBUTION: also Kiangsi, Hupeh, Szechuan, Kweichou, Hunan (*Handel-Mazzetti*, no. 11838).

Photinia villosa DC. var. **sinica** Rehder & Wilson in Sargent, Pl. Wilson. I. 186 (1913).

? *Photinia* spec. Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 132 (1919).

? SHANTUNG: Lau shan (ex Loesener, l. c.).

NORTHERN KIANGSU: Liu lin shan, near Hai chow, *J. Hers*, nos. 642 (sterile, doubtful), 662, May 5, 1921; Hai chow hills, alt. 200 m., *Kang Fu Lai*, Hers no. 2309, October 8, 1922.

DISTRIBUTION (of the variety): also Kiangsi, Hupeh; (of the species): Korea, Japan, Formosa.

Cydonia oblonga Miller, Gard. Dict. (1768).—Hers in Jour. N. China Branch R. As. Soc. LIII. 109 (1922); Liste Ess. Lign. Honan, 10 (1922).

Pyrus Cydonia Linnaeus, Spec. 480 (1753).—Debeaux in Act. Soc. Linn. Bordeaux, XXXI. 156 (Fl. Tché-foû, 61) (1876).—Franchet in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 216 (1884).—Faber in Denkschr. Entwickel. Kiautschou, 32 (1898).

Cydonia vulgaris Persoon, Syn. II. 40 (1807).—Ito in Tokyo Bot. Mag. XIV. 116 (1900).—Gilg in Bot. Jahrb. XXXIV. beibl. LXXV. 39 (1904).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 131 (1919).

SHANTUNG: Chifu, cultivated (ex Debeaux, l. c., Franchet, l. c., and Ito, l. c.); Tsing tau, cultivated (ex Faber, l. c., Gilg, l. c., and Loesener, l. c.).

HONAN: Yung ning, Shang ho, alt. 1000 m., *J. Hers*, no. 838, October 5, 1919 (cultivated according to Mr. Hers' list, though not stated so on the label).

SHENSI: Tai pei shan, *W. Purdom*, no. 960, 1910.

DISTRIBUTION: its native country is supposed to be Persia and Turkestan.

The Quince seems to be very little cultivated in China and apparently only in the northern provinces. It has been recorded from Shantung and Honan and Debeaux states that it is also found in Chili; he remarks that the fruits are much smaller than those of the plant of southern Europe, while Gilg and Loesener state that it has according to Nebel very large fruits. The fruit sent by Mr. Hers from Honan is pear-shaped and about 5 cm. long. There is also a specimen in the herbarium of this Arboretum from Kiangsu, collected near Nanking (Herb. Univ. Nanking, no. 371), this, too, is without doubt from a cultivated plant. Whether Purdom's Shensi specimen is from a cultivated or a wild plant is unfortunately not stated and there is still a possibility that the Quince may be a native of China and that it is only cultivated and naturalized in central and western Asia now supposed to be its native country, but the evidence we have so far is not yet convincing. In Chinese literature it seems to be confused with the Chinese Quince (*Chaenomeles sinensis* Koehne), though Hers states in the label to his no. 838 that it is called by the Chinese "mu li," while the Chinese Quince is called "mu kua li."

Chaenomeles lagenaria Koidzumi in Tokyo Bot. Mag. XXIII. 173 (1909).—Hers in Jour. N. China Branch R. As. Soc. LIII. 108 (1922); Liste Ess. Lign. Honan, 8 (1922).

Chaenomeles japonica Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 101 (Enum. Pl. Chin. Bor. 27) (1833).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 271 (Pl. David. I. 119) (1883).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 132 (1919).—Non Lindley.

Pyrus japonica Hemsley in Jour. Linn. Soc. XXIII. 257 (1887).—Non Thunberg.

Cydonia japonica Pritzel in Bot. Jahrb. XXIX. 388 (1900).—Non Persoon.

Cydonia japonica var. *genuina* (Maxim.) Ito in Tokyo Bot. Mag. XIV. 117 (1900).

CHILI: Peking, cultivated (ex Bunge, l. c., and Hemsley, l. c.).

SHANTUNG: Pearl mountains, *O. Nebel* (ex Loesener, l. c.); Nan shan near Chifu, ? cultivated (ex Ito, l. c.).

HONAN: without special locality, cultivated (ex Hers, l. c.).

SHENSI: Tsin ling shan, *A. David* (ex Franchet, l. c., Hemsley, l. c., and Pritzel, l. c.).

KANSU: Tsing chow, alt. 1400 m., *J. Hers*, no. 2409, July 21, 1922 (sterile).—See also Hemsley, l. c.

DISTRIBUTION (including the varieties): also Hupeh and Szechuan.

The type probably occurs wild on the Tsin ling shan range in Shensi and eastern Kansu and is cultivated elsewhere. The var. *cathayensis* Rehd. grows spontaneously in Hupeh and the following variety in Szechuan and Kansu.

Chaenomeles lagenaria var. **Wilsonii** Rehder in Sargent, Pl. Wilson. II. 298 (1915).

KANSU: on open rocky slopes near Yan pu ko, *F. N. Meyer*, no. 1639, October 6, 1914.

DISTRIBUTION: also Szechuan.

Chaenomeles sinensis Koehne, Gatt. Pomac. 29 (1896), as "C. chinensis."—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 132 (1919).—Hers in Jour. N. China Branch R. As. Soc. LIII. 108 (1922); Liste Ess. Lign. Honan, 8 (1922).

Cydonia sinensis Thouin in Ann. Mus. Paris, XIX. 145, t. 8, 9 (1812).—Gilg in Bot. Jahrb. XXXIX. beibl. LXXV. 39 (1904), as "C. chinensis."

SHANTUNG: near Tsing tau (ex Loesener, l. c., and Gilg, l. c.).

NORTHERN KIANGSU: Wang kia shan, near Hai chow, *J. Hers*, no. 623, May 5, 1921.

HONAN: cultivated (ex Hers, l. c.).

DISTRIBUTION: also Chekiang and cultivated elsewhere by the Chinese for its large fragrant fruit.

Pyrus ussuriensis Maximowicz in Bull. Phys. Math. Acad. Sci. St. Pétersb. XV. 132 (1857); in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 471 (Ind. Fl. Pekin.) (1859).—Rehder in Proc. Am. Acad. Sci. L. 227 (Syn. Chin. Pyrus) (1915).

Pyrus communis Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 101 (Enum. Pl. Chin. Bor. 27) (1833), pro parte.—Non Linnaeus.

Pyrus Simonii Carrière in Rev. Hort. 1872, 28, fig. 3.—Bretschneider, Hist. Eur. Bot. Discov. China, 830 (1898).

Pyrus sinensis Franchet, Nouv. Arch. Mus. Paris, sér. 2, v. 272 (Pl. David. I. 120) (1883).—Hemsley in Jour. Linn. Soc. XXIII. 258 (1887), pro parte.—Non Lindley.

CHILI: "Chin. bor.;" ex herb. Bunge (Gray Herb.); Hsiao Wu tai shan, *F. N. Meyer*, no. 1232, August 20, 1913; Po hau shan, *J. Hers*, no. 1653, September 9, 1921; Tsing shiu tsien, *J. Hers*, no. 1639, September 6, 1921.—See also Maximowicz, l. c. (1859), Rehder, l. c., Bunge, l. c., Franchet, l. c., and Hemsley, l. c.

SHANSI: Hia hsien, Huang lai kow, *J. Hers*, no. 1863, October 2, 1921; Wen jü ho valley, *J. Hers*, no. 2817, October 2, 1923.

DISTRIBUTION: also Manchuria, Korea.

Pyrus ussuriensis var. **ovoidea** Rehder in Jour. Arnold Arb. II. 60 (1920).

Pyrus ovoidea Rehder in Proc. Am. Acad. Sci. L. 228 (1915).—Bailey, Gent. Herb. I. 29 (1920).

HONAN: Kio shan, planted (ex Bailey, l. c.).

SHANSI: near Ping yang fu, cultivated, *F. N. Meyer*, no. 1663, July 31, 1914.

DISTRIBUTION: probably cultivated in Fokien, Yunnan and in Japan, apparently spontaneous in Korea and in Japan, or only naturalized in the latter country.

Pyrus Bretschneideri Rehder in Proc. Am. Acad. Sci. L. 231 (1915).

Pyrus communis Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 101 (Enum. Pl. Chin. Bor. 27) (1833), pro parte.—Non Linnaeus.

CHILI: cultivated near Peking, *F. N. Meyer*, no. 1402, April 29, 1915; near San tung ying, on stony hill slopes, *F. N. Meyer*, no. 996, June 3, 1913 (sterile); Po hua shan, alt. 1000 m., *J. Hers*, no. 2237, October 12, 1922.—See also Rehder, l. c.

This is probably the pai-li alluded to by Bretschneider (Hist. Eur. Bot. Discov. China, 830). It is uncertain whether this is a spontaneous species or a cultivated race or hybrid, a question which can be solved only by careful study and investigation on the spot. The trees growing in the Arnold Arboretum which were raised from seed sent by Dr. Bretschneider in 1882 are quite distinct from any other Pear known from eastern Asia. Hers' no. 2237 which belongs here according to the description of the fruit as given by Mr. Hers has rather finely serrulate leaves with short scarcely acuminate teeth.

Pyrus serotina Rehder in Proc. Am. Acad. Sci. L. 231 (1915).—Bailey, Gent. Herb. I. 29 (1920).

? *Pyrus communis* var. α. *Pyraster* Debeaux in Act. Soc. Linn. Bordeaux, XXXI. 155 (Fl. Tché-foû, 60) (1876).—Non De Candolle.

CHILI: Ming Tombs valley, *F. N. Meyer*, no. 185, October, 1905 (Herb. U. S. Agric. Dept.).

? SHANTUNG: near Chifu (ex Debeaux, l. c.).

HONAN: Chi kung shan, *L. H. Bailey*, June 30, 1917; Sung hsien, Shih tze miao, alt. 1200 m., *J. Hers*, no. 1260, September 25, 1919; Lushih, Hiung eul shan, alt. 1400 m., *J. Hers*, no. 898, October 10, 1919.

DISTRIBUTION: also Hupeh, Szechuan.

Pyrus serotina var. **culta** Rehder in Proc. Am. Acad. Sci. L. 233 (1915).—Hers in Jour. N. China Branch R. As. Soc. LIII. 114 (1922); Liste Ess. Lign. Honan, 24 (1922).

? *Pyrus communis* var. *sativa* Debeaux in Act. Soc. Linn. Bordeaux, XXXI. 156 (Fl. Tché-foû, 61) (1876).—Non De Candolle.

? *Pyrus communis* Thunberg, Fl. Jap. 207 (1784).—Faber, Denkschr. Entwickel. Kiautschou, 32 (1898).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 132 (1919).—Non Linnaeus.

Pyrus sinensis Faber, Denkschr. Entwickel. Kiautschou, 32 (1898).—Ito in Tokyo Bot. Mag. XIV. 117 (1900).—Gilg in Bot. Jahrb. XXXIV. beibl. LXXV. 39 (1904).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 132 (1919).

SHANTUNG: cultivated (ex Debeaux, l. c., Faber, l. c., Ito, l. c., Gilg, l. c., and Loesener, l. c.).

HONAN: cultivated (ex Hers, l. c.).

KANSU: Ho dien, cultivated, *F. N. Meyer*, no. 1865, July 7, 1914.

DISTRIBUTION: cultivated throughout China and Japan.

To this variety apparently belong most of the Pears cultivated in China except in the north where *P. ussuriensis* and *P. Bretschneideri* take its place. The European *P. communis* is not cultivated by the Chinese but is occasionally planted in the gardens of foreign residents and missionaries.

The closely related *P. serrulata* Rehd., differing chiefly in the serrulate leaves with short acute or acuminate, but not setosely acuminate teeth, in the 3–4, rarely 5, styles and in the smaller fruit, does not seem to occur in northern China if a sterile specimen from Hwei hsien, Honan (Hers' no. 720), does not belong here.

Pyrus phaeocarpa Rehder in Proc. Am. Acad. Sci. L. 235 (1915).

CHILI: near Peking, *E. Bretschneider* (ex Rehder, l. c.).

This species is known to me only from cultivated plants raised from seed sent to the Arnold Arboretum in 1882 by Dr. E. Bretschneider. It is most nearly related to *P. betulaefolia*, but easily distinguished by its larger usually 3–4-celled fruit, the larger more closely serrate glabrous leaves and the less tomentose branchlets and inflorescence. Besides the typical form with pear-shaped fruit, there is a form with globose fruit distinguished as f. *globosa* Rehd. (l. c.).

Pyrus betulaefolia Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 101 (Enum. Pl. Chin. Bor. 27) (1833).—Walpers, Rep. II. 53 (1843).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 471 (Ind. Fl. Pekin.) (1859); in Bull. Acad. Sci. St. Pétersb. XIX. 172 (1873); in Mél. Biol. IX. 169 (1873).—Debeaux in Act. Soc. Linn. Bordeaux, XXXI. 156, (Fl. Tché-foû, 61) (1876).—Franchet in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 217 (1884).—Hemsley in Jour. Linn. Soc. XXIII. 256 (1887).—Bretschneider, Hist. Eur. Bot. Discov. China, 333, 830, 1053 (1898).—Faber, Denkschr. Entwickel. Kiautschou, 32 (1898).—Pritzel in Bot. Jahrb. XXIX. 387 (1900), pro parte.—Gilg in Bot. Jahrb. XXXIV. beibl. LXXV. 39 (1904).—Rehder in Proc. Am. Acad. Sci. L. 236 (1915).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 132 (1919).—Bailey, Gent. Herb. I. 29 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 114 (1922); Liste Ess. Lign. Honan, 24 (1922).—Cowdry in Jour. N. China Branch R. As. Soc. LIII. 164 (Pl. Peitaiho) (1922).

Pirus sp. (an *P. betulaefolia* Bge.) Ito in Tokyo Bot. Mag. XIV. 118 (1900).

CHILI: Pao ting fu plain, *W. Purdom*, no. 1009, 1909; East cliff, Peitaiho, *N. H. Cowdry*, no. 153, May 23, 1919.—See also Bunge, l. c., Walpers, l. c., Maximowicz, l. c., Hemsley, l. c., and Rehder, l. c.

SHANTUNG: Lau shan, *F. N. Meyer*, no. 308, August, 1907; without precise locality, *F. N. Meyer*, no. 398, September, 1907.—See also Debeaux, l. c., Franchet, l. c., Hemsley, l. c., Faber, l. c., Gilg, l. c., Loesener, l. c., and Ito, l. c.

HONAN: Hwei hsien, Chung hu, *J. Hers*, no. 743, June 17, 1919; without precise locality, *J. Hers*, no. 33, 1918.—See also Hers, l. c.

SHANSI: Ping yang fu, *F. N. Meyer*, no. 1659, July 25, 1914.

SHENSI: Yenan fu, *W. Purdom*, no. 328, 1910.—See also Pritzel, l. c.

DISTRIBUTION: also Kiangsu, Kiangsi, Hupeh.

Pyrus Calleryana Decaisne, Jard. Fruit. I. in textu sub t. 8 (1872).—Maximowicz in Bull. Soc. Nat. Moscou, LIV. pt. I. 18 (1879).—Hemsley in Jour. Linn. Soc. XXIII. 256 (1887).—Bailey, Gent. Herb. I. 29 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 114 (1922); Liste Ess. Lign. Honan, 24 (1922).

SHANTUNG: Chifu (ex Maximowicz, l. c., and Hemsley, l. c.).

HONAN: Lushih, Tung ho, alt. 1000 m., *J. Hers*, no. 991bis, October

14, 1919; Lushih, Lao kiun shan, alt. 2000 m., *J. Hers*, no. 1147, September 21, 1919; Yung ning, Tsi li ping, alt. 1000 m., *J. Hers*, no. 477, May 22, 1919 and nos. 1333, 1352, 1365, September 30, 1919; Tsi yuan hsien, Tien tan shan, *J. Hers*, no. 1720, September 20, 1921.—See also Bailey, l. c., and Hers, l. c.

SHANSI: Lien ma, *F. N. Meyer*, no. 1658, July 30, 1914.

DISTRIBUTION: also Hupeh, Chekiang, Kiangsi, Fokien and Kwangtung.

Pyrus kolupana Schneider, Ill. Handb. Laubholzk. I. 665 (1906); in Fedde, Rep. Nov. Spec. III. 120 (1907).

Pyrus betulifolia Pritzel in Bot. Jahrb. XXIX. 387 (1900), pro parte.—Non Bunge.

SHENSI: Kolupa, *G. Giraldi*, nos. 1050 and 5105 (ex Schneider, l. c., and Pritzel, l. c.).

Pyrus pashia Hamilton apud D. Don, Prodr. Fl. Nepal. 236 (1825).—Rehder in Proc. Am. Acad. Sci. L. 238 (1915).

Pyrus serrulata F. N. Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds Pl. Imp. XLIII. 72, nos. 40724, 40725 (1918).—Non Rehder.

SHANSI: near Wu chai, *F. N. Meyer*, no. 1657, July 19, 1914.

KANSU: near Liang Tang on rocky mountain slopes, *F. N. Meyer*, nos. 1946, 1947, 1952, September 24 and 25, 1914.

DISTRIBUTION: also Szechuan, Yunnan; Himalayas.

The extension of the range of an Himalayan species as far northeast as Shansi is unusual, but the leaves of the specimen agree well with those of *P. pashia* and the solitary fruit is small, 3-celled and has a persistent calyx, as is sometimes the case in *P. pashia;* the specimens from Kansu are very similar and have partly persistent and partly deciduous calyx.

The account given above of the pears of northern China is necessarily incomplete and unsatisfactory, as the material at my disposition is very fragmentary, in many cases consisting only of sterile branches. We cannot hope to arrive at a satisfactory understanding and classification of the Chinese pears, spontaneous and cultivated, unless we have ample flowering and fruiting material from the same locality or still better from the same tree with notes on the color and nature of the fruit and reliable statements whether the tree is cultivated or spontaneous or possibly escaped from cultivation.

Malus prunifolia Borkhausen, Handb. Forstbot. II. 1278 (1803).—Rehder in Sargent, Pl. Wilson. II. 288 (1915).

? *Pyrus Malus* var. *glabra* Debeaux in Act. Soc. Linn. Bordeaux, XXXI. 155 (Fl. Tché-foû, 60) (1876).—Non W. D. Koch.

? SHANTUNG: Chifu (ex Debeaux, l. c.).

SHANSI: Ping yang fu, cultivated, *F. N. Meyer*, no. 1666, July 31, 1914 (Herb. U. S. Dept. Agric.).

DISTRIBUTION: Siberia.

According to Debeaux's description "fructibus parvis acerbis, foliis germinibusque glaberrimis" his plant must be either typical *M. prunifolia* or possibly *M. baccata* Mill., but the former is not known from China at all and it is therefore doubtful if it occurs spontaneously in Shantung. Meyer's specimen which is sterile is perfectly glabrous and therefore seems to belong here rather than to var. *rinki*.

Malus prunifolia Borkh. var. **rinki** Rehder in Sargent, Pl. Wilson. II. 279 (1915).

Pyrus Malus Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 101 (Enum. Pl. Chin. Bor. 27) (1833).—Debeaux in Act. Soc. Linn. Bordeaux, XXXIII. 43 (Fl. Tien-tsin, 20) (1879).—Franchet in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 216 (1884).—Hemsley in Jour. Linn. Soc. XXIII. 257 (1887).—Faber, Denkschr. Entwickel. Kiautschou, 32 (1898).—Non Linnaeus.

? *Pyrus prunifolia* Debeaux in Act. Soc. Linn. Bordeaux, XXXI. 155 (Fl. Tché-foû, 60) (1876).—Franchet in Mém. Soc. Sci. Nat. Cherbourg, XXXI. 216 (1884).—Non Willdenow.

Pyrus Malus β. *tomentosa* Franchet in Mém. Soc. Sci. Nat. Cherbourg, XXXI. 216 (1884).—Ito in Tokyo Bot. Mag. XIV. 118 (1900).—Non W. D. Koch.

Malus domestica Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 132 (1919).—Non Borkhausen.

CHILI: Peking, western hills, *J. Hers*, nos. 2245, 2246, 2253 (abnormal flowering), October 14, 1922; Ta han king, *J. Hers*, no. 1640, September 7, 1921; Hsiao Wu tai shan, cultivated, *F. N. Meyer*, no. 1234, August 20, 1913 (Herb. U. S. Dept. Agric.); Po hua shan, *J. Hers*, no. 1385, May 1, 1921.—See also Bunge, l. c., and Debeaux, l. c. (1879).

SHANTUNG: Chifu (ex Franchet, l. c., and Debeaux, l. c. [1876]); Tsing tau (ex Faber, l. c., Ito, l. c., and Loesener, l. c.).

HONAN: Chengchow, more or less wild, used as stock, *J. Hers*, no. 1908, April 15, 1922.

DISTRIBUTION: Hupeh; cultivated elsewhere in China and in Korea and Japan.

This is apparently the Apple commonly cultivated in China. According to Wilson it occurs spontaneous in Hupeh; also Hers' no. 1385 from the Po hua shan, Chili, may be from a tree growing wild. The specimen from Cheng chow looks much like *M. pumila* Mill. as it has rather short densely villose pedicels, but without fruit, its determination rests doubtful and it seems safer to consider it a form of the Chinese Apple.

Malus spectabilis Borkhausen, Handb. Forstbot. II. 1279 (1803).—Rehder in Sargent, Pl. Wilson. II. 289 (1915).—Hers in Jour. N. China Branch R. As. Soc. LIII. 112 (1922); Liste Ess. Lign. Honan, 19 (1922).

Pyrus spectabilis Aiton, Hort. Kew. II. 175 (1789).—Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 289 (Enum. Pl. Chin. Bor. 27) (1833).—Maximowicz in Bull. Acad. Sci. St. Pétersb. XIX. 170 (1873); in Mél. Biol. IX. 166 (1873), excl. synon.—Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 271 (Pl. David. I. 119) (1883); in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 217 (Cat. Pl. Tché-foû) (1884).—Hemsley in Jour. Linn. Soc. XXIII. 258 (1887), exclud. syn. plur. et plantis e Kiangsi et Hupeh.—Bailey, Gent. Herb. I. 29 (1920).

Malus sp. F. N. Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds · Pl. Imp. XXXIX. 105, no. 38231 (1917).

CHILI: Peking, Imperial gardens, *C. S. Sargent*, September 17, 1903.—See also Rehder, l. c., Bunge, l. c., Maximowicz, l. c., Franchet, l. c. (1883), Hemsley, l. c., and Bailey, l. c.

SHANTUNG: Chifu (ex Franchet, l. c. [1884]).

HONAN: Yu tai shan, *J. Hers*, no. 317, April 20, 1920.—See also Hers, l. c.

SHENSI: Sian fu, planted, *F. N. Meyer*, no. 1106, January 30, 1914 (grafts only; plants growing at Chico, California).

This species is known only as a cultivated plant; also Hers' no. 317 from Honan, though there is no statement on the label and it is not marked as cultivated in his published list, is apparently from a planted tree, as it has semi-double flowers.

Malus baccata Borkhausen, Handb. Forstbot. II. 1280 (1803).—Rehder in Sargent, Pl. Wilson. II. 291 (1915).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 132 (1919).

Pyrus baccata Linnaeus, Mant. 75 (1767).—Hance in Jour. Bot. XIII. 132 (1875).—Hemsley in Jour. Linn. Soc. XXIII. 255 (1887).

Pyrus baccata α. *sibirica* Maximowicz in Bull. Acad. Sci. St. Pétersb. XIX. 170 (1873); in Mél. Biol. IX. 166 (1873).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 272 (Pl. David. I. 120) (1883).

Pyrus baccata β. *mandshurica* Maximowicz in Bull. Acad. Sci. St. Pétersb. XIX. 170 (1873); in Mél. Biol. IX. 166 (1873), quoad plantam glabratum Pekinensem.—Bretschneider, Hist. Eur. Bot. Discov. China, 1053 (1898).

CHILI: Jehol, *A. David*, no. 1728 (Gray Herb.); Weichang, *W. Purdom*, no. 23, 1909; Shi fen ko, *F. N. Meyer*, no. 998, June 3, 1913 (Herb. U. S. Dept. Agric.); near Peking, *O. Warburg*, no. 6611; Po hua shan, *J. Hers*, no. 1426, May 1, 1921; Liang feng kow, *J. Hers*, nos. 1644, 1647, September 8, 1921; Miao Feng shan, *J. Hers*, no. 2535, June 17, 1923; Hsiao Wu tai shan, alt. 1600 m., *F. N. Meyer*, no. 1254, August 21, 1913.—See also Rehder, l. c., Hemsley, l. c., Franchet, l. c., Maximowicz, l. c., and Bretschneider, l. c.

SHANTUNG: Tung hu shui and Lau shan (ex Loesener, l. c.).

SHANSI: Wu chai hsien, Ta nan kow, alt. 2000 to 3000 m., *Tchuang Kieh*, Hers no. 2039, September 7, 1922; Wu tai shan, alt. 1300 m., *J. Hers*, no. 2612, July 29, 1923; Schao yü, *F. N. Meyer*, no. 1877, July 22, 1914 (Herb. U. S. Dept. Agric.).

SHENSI: Yenan fu, *W. Purdom*, no. 329, 1910; Lung chow, Li kia po, *J. Hers*, no. 2386, July 4, 1922.—See also Rehder, l. c.

KANSU: south of Hoang ho, *P. J. Piasezki* (ex Hemsley, l. c.).

DISTRIBUTION: also Manchuria, eastern Siberia.

Malus baccata f. **gracilis** Rehder in Jour. Arnold Arb. II. 49 (1920).

NORTHERN CHINA: (ex Rehder, l. c.).

This form differs from the type chiefly in its lower stature, slender pendent branches, comparatively narrower obtusely serrulate leaves on slenderer petioles, in the smaller flowers with often only 4 styles and in the small fruit. It is known only from cultivated plants raised

from seed sent by Mr. Purdom from northern China without indication of precise locality.

Malus baccata var. **mandshurica** Schneider, Ill. Handb. Laubholzk. I. 721, fig. 397n (1906).—Rehder in Sargent, Pl. Wilson. II. 281 (1915).

Pyrus baccata β. *mandshurica* Maximowicz in Bull. Acad. Sci. St. Pétersb. XIX. 170 (1873); in Mél. Biol. IX. 166 (1873), excl. planta glabrata Pekinensi.—Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 272 (Pl. David. I. 120) (1883).—Bretschneider, Hist. Eur. Bot. Discov. China, 1053 (1898).—Ito in Tokyo Bot. Mag. XIV. 119 (1900).

Malus baccata Hers in Jour. N. China Branch R. As. Soc. LIII. 112 (1922); Liste Ess. Lign. Honan, 18 (1922).—Vix Borkhausen.

CHILI: near Jehol, *A. David* (ex Franchet, l. c.).

SHANTUNG: near Chifu and on Island of Liu kung (ex Ito, l. c.).

NORTHERN KIANGSU: Liu lin shan, near Hai chow, *J. Hers*, no. 633, May 5, 1921; Hai chow hills, alt. about 200 m., *Kang Fu Lai*, Hers no. 2306, October 8, 1922.

HONAN: Tsi yuan hsien, Tien tan shan, *J. Hers*, no. 1815, September 21, 1921; Cheng chow, cultivated, *J. Hers*, no. 3, May 9, 1919; Lushih, Lao kiun shan, alt. 2000 m., *J. Hers*, no. 1161, September 21, 1919.

DISTRIBUTION: Kiangsi, Hupeh; eastern Siberia, Korea, Japan.

Malus robusta (*M. baccata* × *prunifolia*) Rehder in Jour. Arnold Arb. II. 54 (1920).

I have no doubt that this hybrid, cultivated in many forms in this country and in Europe, occurs in northern China, though I have seen no specimens.

Malus robusta var. **persicifolia** Rehder, l. c. 55 (1920).

NORTHERN CHINA: without locality, *W. Purdom*, no. 179 (seeds only; plants raised in the Veitchian nurseries are now growing in this Arboretum).

Malus theifera Rehder in Sargent, Pl. Wilson. II. 283 (1915).—Hers in Jour. N. China Branch R. As. Soc. LIII. 116 (1922); Liste Ess. Lign. Honan, 29 (1922).

HONAN: Teng feng, Yu tai shan, alt. 800 m., *J. Hers*, no. 237, April 23, 1919; Lushih, Hiung eul shan, alt. 1400 m., *J. Hers*, no. 906, October 10, 1919; Yung ning, Chuan pao shan, alt. 1500 m., *J. Hers*, no. 1115, October 17, 1919; Tsi yuan hsien, Tien tan shan, *J. Hers*, no. 1710, September 20, 1921.—See also Hers, l. c.

SHENSI: near Kwan yin tang, alt. 1200 m., *F. N. Meyer*, no. 1901, September 15, 1914; Po uo li, *G. Giraldi*, July 25–30, 1897.—See also Rehder, l. c.

DISTRIBUTION: also Chekiang, Kiangsi, Hupeh, Szechuan, Kweichou, Yunnan; Assam.

Malus transitoria Schneider, Ill. Handb. Laubholzk. I. 726 (1906).—Rehder in Sargent, Pl. Wilson. II. 295 (1915).

Pyrus transitoria Batalin in Act. Hort. Petrop. XIII. 95 (1893).—Bretschneider, Hist. Eur. Bot. Discov. China, 975 (1898).

SHENSI: Yenan fu district, *W. Purdom*, no. 322, 1910.

KANSU: Tibetan country southwest of Choni, *W. Purdom*, no. 1046, 1910; brought in by Tibetans from south of the Peling Mountains, *W. Purdom*, no. 1135, 1910.—See also Schneider, l. c., Rehder, l. c., and Batalin, l. c.

Malus toringoides Hughes in Kew Bull. Misc. Inform. 1920, 205, fig. B, a–e.

Malus transitoria var. *toringoides* Rehder in Sargent, Pl. Wilson. I. 286 (1915).

KANSU: near Fu orr yei, *F. N. Meyer*, no. 1975, October 7, 1914 (Herb. U. S. Dept. Agric.).

Malus kansuensis Schneider in Fedde, Rep. Spec. Nov. III. 178 (1906).—Rehder in Sargent, Pl. Wilson. II. 286 (1915).

Pyrus kansuensis Batalin in Act. Hort. Petrop. XIII. 94 (1893).

SHENSI: near Kwan yin tang, *F. N. Meyer*, no. 1906, September 15, 1914 (Herb. U. S. Dept. Agric.).

KANSU: Tibetan country, south of Tow River, *W. Purdom*, no. 1142, 1910.—See also Rehder, l. c.

DISTRIBUTION: also Hupeh, Szechuan.

Malus kansuensis f. **calva** Rehder in Jour. Arnold Arb. II. 50 (1920).

SHENSI: Tai pei shan, *W. Purdom*, no. 1118, 1910.—See also Rehder, l. c.

DISTRIBUTION: also Hupeh, Szechuan.

Malus honanensis Rehder in Jour. Arnold Arb. II. 51 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 112 (1922); Liste Ess. Lign. Honan, 19 (1922).

HONAN: Sung hsien, Shih tze miao, *J. Hers*, nos. 489, 573, May 26, 1919; Teng feng hsien, Yu tai shan, alt. 800 m., *J. Hers*, nos. 222, 222bis, April 23 and June 17, 1919, no. 322, April 20, 1920; Tsi yuan hsien, Tien tan shan, *J. Hers*, nos. 1691, 1784, 1797, September 16 and 21, 1921; Hwei hsien, Shang lieh kiang, *J. Hers*, no. 725, June 17, 1919; Cheng chow, cultivated, *J. Hers*, nos. 194, 195, April 24 and May 5, 1921, no. 2495, May 1, 1923.—See also Rehder, l. c., and Hers, l. c.

SHENSI: Lung chow, Kuan shan, alt. 2000 m., *J. Hers*, no. 2353, July 3, 1922 (sterile).

Amelanchier asiatica var. **sinica** Schneider, Ill. Handb. Laubholzk. I. 736, fig. 410 i–i^1, 412c–d (1906).—Wilson in Sargent, Pl. Wilson. I. 195 (1912).—Hers in Jour. N. China Branch R. As. Soc. LIII. 106 (1922); Liste Ess. Lign. Honan, 3 (1922).

Amelanchier asiaticus Pritzel in Bot. Jahrb. XXIX. 389 (1900).—Hers in Jour. N. China Branch R. As. Soc. LIII. 106 (1922); Liste Ess. Lign. Honan, 3 (1922).

HONAN: Sung hsien, San kuan miao, alt. about 1200 m., *J. Hers*, nos. 503, 504, May 24, 1919, nos. 1301, 1324, September 27, 1919; Lushih, Kiao ho, alt. 1000 m., *J. Hers*, no. 973, October 13, 1919; Lushih, Lao kiun shan, alt. 2000 m., *J. Hers*, no. 1155, September 21, 1919; Yung ning, Tsi li ping, alt.

about 1000 m., *J. Hers*, no. 1357, September 30, 1919; Tsi yuan hsien, Tien tan shan, *J. Hers*, nos. 1730, 1895, 1896, September 21, 1921.—See also Hers, l. c.

SHENSI: Kan y san, west of Lao y san, *G. Giraldi*, June 11–12, 1897; Ling yen tan, alt. 700 m., *J. Hers*, no. 2445, October 11, 1922.

DISTRIBUTION: also Hupeh, Szechuan; (of the species): Japan and Korea.

Rubus saxatilis Linnaeus, Spec. 494 (1753).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 261 (Pl. David. I. 109) (1883).—Hemsley in Jour. Linn. Soc. XXIII. 237 (1887).—Limpricht, Bot. Reis. Hochgeb. Chin. Ost.-Tib. 407 (1922).

CHILI: Hsiao Wu tai shan, *F. N. Meyer*, no. 1345, August 23, 1913 (Herb. U. S. Dept. Agric.).—See also Franchet, l. c., Hemsley, l. c., and Limpricht, l. c.

DISTRIBUTION: also Northern Asia, Europe.

Rubus xanthocarpus Bureau & Franchet in Jour. de Bot. v. 46 (1891).—Regel in Gartenfl. XLI. 108 (1892).—Bretschneider, Hist. Eur. Bot. Discov. China, 1028 (1898).—Focke in Bibl. Bot. LXXII. 29 (Spec. Rub.) (1910).

KANSU: Kuan chuan, *F. N. Meyer*, no. 1979, October 7, 1914 (Herb. U. S. Dept. Agric.).—See also Regel, l. c., Bretschneider, l. c., and Focke, l. c.

DISTRIBUTION: also Szechuan.

Rubus Lambertianus Seringe in De Candolle, Prodr. II. 567 (1825).—Bailey, Gent. Herb. I. 30 (1920).

Rubus Lambertianus subsp. *hakonensis* (Franchet & Savatier) Focke in Bot. Jahrb. XXIX. 392 (1900); in Bibl. Bot. LXXII. 70 (Spec. Rub.) (1910).

HONAN: Chi kung shan (ex Bailey, l. c.).

SHENSI: *G. Giraldi*, no. 1080 (ex Focke, l. c. [1900]).

DISTRIBUTION: also central and eastern China; Formosa, Japan.

Rubus corchorifolius Linnaeus fil., Suppl. 263 (1781).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 261 (Pl. David. I. 109) (1883).—Bailey, Gent. Herb. I. 30 (1920).

Rubus corchorifolius α. *typica* Focke in Bot. Jahrb. XXIX. 391 (1900).

CHILI: on stony soil, near Shan hai kwan, *F. N. Meyer*, no. 269, October, 1905 (Herb. U. S. Dept. Agric.).

SHENSI: *A. David* (ex Franchet, l. c.) and *G. Giraldi* (ex Focke, l. c.).

HONAN: Chikung shan (ex Bailey, l. c.).

DISTRIBUTION: also central and eastern China; Japan.

Rubus crataegifolius Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 98 (Enum. Pl. Chin. Bor. 24) (1833).—Walpers, Rep. II. 21 (1843).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 471 (Ind. Fl. Pekin.) (1859); in Bull. Acad. Sci. St. Pétersb. XVII. 153 (1872); in Mél. Biol. VIII. 383 (1872).—Hance in Jour. Bot. XIII. 132 (1875); XXII. 42 (1884).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 261 (Pl. David. I. 109) (1883).—Hemsley in Jour. Linn. Soc. XXIII. 230 (1887).—Bretschneider, Hist. Eur.

Bot. Discov. China, 333 (1898).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 133 (1919).

Rubus Davidianus Kuntze, Meth. Speciesbeschr. Rubus, 58, 77, 80 (1879).

CHILI: Hsiao Wu tai shan, *F. N. Meyer*, no. 1356, August 28, 1913; Hsiao Wu tai shan, Shui shih tao, alt. 1500 m., *J. Hers*, nos. 2152 and 2186, October 8, 1922; Po hua shan, *J. Hers*, no. 1446, July 1, 1921; Peking, western hills, *J. Hers*, no. 1614, September 4, 1921; *N. H. Cowdry*, no. 1298[b], October 12, 1920; Men tow kow, alt. 500 m., *J. Hers*, no. 2555, July 8, 1923; Pan shan, mountain ravines, *N. H. Cowdry*, no. 1298[a], July 8, 1920; Huai lai hsien, Yang kia ping, alt. 900 m., *J. Hers*, no. 2103, October 4, 1922; Chang li, *F. N. Meyer*, no. 193, October, 1905; *Père Chanet*, no. 56, 1919.—See also Bunge, l. c., Maximowicz, l. c., Hance, l. c., Franchet, l. c., and Hemsley, l. c.

SHANTUNG: Chifu, among rocks, *N. H. Cowdry*, nos. 579 and 619, July and August, 1920; Tai shan, *J. Hers*, no. 1928, June 18, 1922.—See also Loesener, l. c.

DISTRIBUTION: also Manchuria, Korea, Japan.

I have little doubt that Kuntze's *R. Davidianus* belongs here, though Kuntze describes the fruit as white; I do not know if white-fruited forms exist, but in some herbarium specimens before me, e. g. Faurie's no. 6083 from Asama, Japan, and Sargent's specimens collected September 6, 1892, at Yumoto, Japan, the dried fruits give the impression of having been white.

Rubus pungens Cambessèdes in Jacquemont, Voy. IV. 48, t. 59 (1843).—Focke in Bot. Jahrb. XXXVI. beibl. LXXXII. 53 (1905); in Bibl. Bot. LXXII. 165 (Spec. Rub.) (1911).

SHENSI: Lao y shan, *G. Giraldi*, no. 5206 (ex Focke, l. c.).

DISTRIBUTION: also Hupeh, Yunnan; Kashmir, Punjab; Japan.

Rubus pungens var. **indefensus** Focke in Bot. Jahrb. XXXVI. beibl. LXXXII. 53 (1905); in Bibl. Bot. LXXII. 165 (Spec. Rub.) (1911).

SHENSI: Huan tou shan, Kian shan, *G. Giraldi*, nos. 5203, 5204, 5205, 5207 (ex Focke, l. c. [1905]).

DISTRIBUTION: also Hupeh.

Rubus amabilis Focke in Bot. Jahrb. XXXVI. beibl. LXXXII. 53 (1905); in Bibl. Bot. LXXII. 163, fig. 70 (Spec. Rub.) (1911).

SHENSI: Tai pei shan, *W. Purdom*, no. 962, 1910.—See also Focke, l. c.

DISTRIBUTION: also Hupeh, Szechuan.

Rubus biflorus Buchanan-Hamilton apud Smith in Rees, Cyclop. XXX. no. 9 (1819).—Focke in Bot. Jahrb. XXXVI. beibl. LXXXII. 397 (1905).

SHENSI: Hua tzo pin, *G. Giraldi*, no. 1072 (ex Focke, l. c.).

DISTRIBUTION: also Szechuan, Yunnan; Himalayas.

Rubus pileatus Focke in Hooker's Icon. XX. text sub t. 1952, p. 3 (1891); in Bot. Jahrb. XXXVI. beibl. LXXXII. 53 (1905).

SHENSI: Kian shan, Lao y shan, *G. Giraldi*, no. 5224 (ex Focke, l. c. [1905]).

DISTRIBUTION: also Hupeh, Szechuan.

Rubus lasiostylus Focke in Hooker's Icon. XX. t. 1951 (1891).—Focke in Bot. Jahrb. XXIX. 397 (1900).

? HONAN: Lushih, Tang ho, alt. 1000 m., *J. Hers*, no. 960, October 11, 1919; Lushih, Lao kiun shan, alt. 2000 m., *J. Hers*, no. 1178, September 21, 1919 (both nos. sterile).

SHENSI: Lun san huo, *G. Giraldi*, no. 1073 (ex Focke, l. c.).

DISTRIBUTION: also Hupeh.

As the specimens from Honan consist of sterile shoots I am not sure if they belong here, though they agree well with corresponding material of this species.

Rubus pedunculosus D. Don, Prodr. Fl. Nepal. 234 (1825).

Rubus gracilis Roxburgh, Hort. Bengal. 39 (1814), nomen; Fl. Ind. ed. 2, II. 519 (1832).—Focke in Bibl. Bot. LXXII. 190 (Spec. Rub.) (1911).

Rubus niveus Wallich mss. apud G. Don, Gen. Syst. II. 530 (1832).—Non Thunberg.

Rubus euleucus Focke in Bot. Jahrb. XXIX. 397 (1900); XXXVI. beibl. LXXXII. 54 (1905).

SHENSI: Lao y san, *G. Giraldi*, no. 5208 (ex Focke, l. c. [1905]).

DISTRIBUTION: also Hupeh, Szechuan; Himalayas.

Rubus coreanus Miquel in Ann. Mus. Lugd.-Bat. III. 34 (1867); Prol. Fl. Jap. 222 (1867).—Focke in Bot. Jahrb. XXIX. 400 (1900); XXXVI. beibl. LXXXII. 54 (1905).—Bailey, Gent. Herb. I. 30 (1920).

HONAN: Chi kung shan, *L. H. Bailey*, June 15, 1917 (Gray Herb.).

SHENSI: from several localities, *G. Giraldi*, nos. 1062, 1063, 5216, 5217 (ex Focke, l. c.).

DISTRIBUTION: also Hupeh, Kiangsi; Japan.

Rubus parvifolius Linnaeus, Spec. 1197 (1753), excl. synon.—Maximowicz in Bull. Acad. Sci. St. Pétersb. XVII. 159 (1872); in Mél. Biol. VIII. 392 (1872).—Debeaux in Act. Soc. Linn. Bordeaux, XXXI. 149 (Fl. Tché-foû, 54) (1876).—Franchet in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 214 (1884).—Hemsley in Jour. Linn. Soc. XXIII. 235 (1887).—Faber in Denkschr. Entwickel. Kiautschou, 32 (1898).—Ito in Tokyo Bot. Mag. XIV. 129 (1900).—Gilg & Loesener in Bot. Jahrb. XXXIV. beibl. LXXV. 39 (1904).—Cowdry in Jour. N. China Branch R. As. Soc. LIII. 164 (1922).

Rubus triphyllus Thunberg, Fl. Jap. 215 (1784).—Focke in Bot. Jahrb. XXIX. 397 (1900); XXXVI. beibl. LXXXII. 55 (1905).—Hers in Jour. N. China Branch R. As. Soc. LIII. 115 (1922); Liste Ess. Lign. Honan, 27 (1922).

Rubus purpureus Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 98 (Enum. Pl. Chin. Bor. 24) (1833).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 471 (Ind. Fl. Pekin.) (1859).—Bretschneider, Hist. Eur. Bot. Discov. China, 333 (1898).

Rubus triphyllus var. (subspec.?) *purpureus* Focke in Bibl. Bot. LXXII. 187 (Spec. Rub.) (1911).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 133 (1919).

CHILI: Without precise locality, *Père Chanet*, no. 99, 1919.—See also Maximowicz, l. c. (1872), Hemsley, l. c., Cowdry, l. c., Bunge, l. c., Maximowicz, l. c. (1859), and Bretschneider, l. c.

SHANTUNG: Tsing tau, *R. Zimmermann*, no. 185, 1901 (Gray Herb.); Chifu, *Com. Wykeham Perry*, 1881–84 (Gray Herb.); among rocks on hills, *N. H. Cowdry*, no. 520, July, 1920.—See also Debeaux, l. c., Franchet, l. c., Faber, l. c., Ito, l. c., Gilg & Loesener, l. c., and Loesener, l. c.

HONAN: Hwei hsien, Pai yun sze, *J. Hers*, no. 787, June 15, 1919; Yung ning, Tsi li ping, *J. Hers*, no. 479, May 22, 1919; Yung ning, She pa pan, alt. 800 m., *J. Hers*, no. 845, October 7, 1919; Yung ning, Chuan pao shan, alt. 1500 m., *J. Hers*, no. 1108, October 17, 1919; Shan chow, Tsai yuan, alt. 500, *J. Hers*, no. 816, October 3, 1919; Tsi yuan hsien, Tien tan shan, *J. Hers*, nos. 1690, 1726, September 16 and 22, 1921; Chung chow, introduced from the hills, *J. Hers*, no. 2510, June 1, 1923.—See also Hers, l. c.

SHANSI: Lien ma, *F. N. Meyer*, no. 1706, July 19, 1914 (Herb. U. S. Dept. Agric.).

SHENSI: several localities, *G. Giraldi* (ex Focke, l. c. [1900 and 1905]).

DISTRIBUTION: from Manchuria, Korea and Japan to Kwangtung, Szechuan, Yunnan and the Himalayas.

Rubus Sweginzowianus Focke in Bibl. Bot. LXXII. 188 (Spec. Rub.) (1911).

? KANSU: ex Focke, l. c.

Cultivated by Max van Sievers, Roemershof, Livonia, and supposed to have been introduced from Kansu. See also note under *Rosa Sweginzowii* on p. 207.

Rubus adenochlamys Focke in Bibl. Bot. LXXII. 191 (Spec. Rub.) (1911).
Rubus triphyllus var. *adenochlamys* Focke in Bot. Jahrb. XXXVI. beibl. LXXXII. 55 (1905).

SHENSI: several localities, *G. Giraldi* (ex Focke, l. c.).

Rubus phoenicolasius Maximowicz in Bull. Acad. Sci. St. Pétersb. XVII. 160 (1872); Mél. Biol. VIII. 393 (1872).—Hemsley in Jour. Linn. Soc. XXIII. 235 (1887).—Focke in Bot. Jahrb. XXIX. 400 (1900); XXXVI. beibl. LXXXII. 55 (1905).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 133 (1919).

SHANTUNG: Lau shan, *A. Engler*, no. 6988 (ex Loesener, l. c.).

HONAN: Lushih, Hiung eul shan, alt. 1400 m., *J. Hers*, no. 880, October 10, 1919 (sterile).

SHENSI: Tai pei shan, *W. Purdom*, no. 961, 1910.—See also Focke, l.c.

KANSU: south of Hoang ho, *P. J. Piasezki* (ex Hemsley, l. c.).

DISTRIBUTION: also Japan.

Rubus flosculosus Focke in Hooker's Icon. XX. in textu ad t. 1952, p. 3 (1891); in Bot. Jahrb. XXIX. 401 (1900); XXXVI. beibl. LXXXII. 54 (1905).—Hers in Jour. N. China Branch R. As. Soc. LIII. 115 (1922); Liste Ess. Lign. Honan, 27 (1922).

HONAN: Hwei hsien, Shansi border, *J. Hers*, no. 806, June 19, 1919:

Sung hsien, San kuan miao, alt. 1000 m., *J. Hers*, no. 1303, September 27, 1919.—See also Hers, l. c.

SHENSI: several localities, *G. Giraldi* (ex Focke, l. c.).

DISTRIBUTION: also Hupeh.

Rubus Giraldianus Focke in Bot. Jahrb. XXIX. 401 (1900); in Bibl. Bot. LXXII. 195 (Spec. Rub.) (1911).

Rubus flosculosus f. *laxiflorus* Focke in Sargent, Pl. Wilson. I. 55 (1911).

SHENSI: Tue lian pin, *G. Giraldi*, no. 1070 (ex Focke, l. c.).

DISTRIBUTION: also Szechuan.

Rubus innominatus S. Moore in Jour. Bot. XIII. 226 (1875).—Focke in Bot. Jahrb. XXIX. 400 (1900).

SHENSI: Lun shan huo, *G. Giraldi*, no. 1077 (ex Focke, l. c.).

DISTRIBUTION: also Kiangsi, Hupeh, Szechuan, Yunnan.

Rubus piluliferus Focke in Bot. Jahrb. XXXVI. beibl. LXXXII. 55 (1905); in Bibl. Bot. LXXII. 203 (Spec. Rub.) (1911).

SHENSI: Kin qua san, *G. Giraldi*, no. 5222 (ex Focke, l. c.).

Rubus lachnocarpus Focke in Bot. Jahrb. XXXVI. beibl. LXXXII. 56 (1905); in Bibl. Bot. LXXII. 204 (Spec. Rub.) (1911).

SHENSI: Ngo shan, *G. Giraldi*, no. 5215 (ex Focke, l. c.).

Rubus mesogaeus Focke in Bot. Jahrb. XXIX. 399 (1900); XXXVI. beibl. LXXXII. 55 (1905).—Hers in Jour. N. China Branch R. As. Soc. LIII. 115 (1922); Liste Ess. Lign. Honan, 27 (1922).

HONAN: Teng feng, Yu tai shan, alt. about 800 m., *J. Hers*, no. 289, June 17, 1919; Yung ning, Tsi li ping, *J. Hers*, no. 480, May 22, 1919; Yung ning, Chuan pao shan, alt. 1500 m., *J. Hers*, no. 1112, October 17, 1919; Lushih, Hiung eul shan, alt. 1400 m., *J. Hers*, no. 897, October 10, 1919; Lushih, Kiao ho, alt. 1000 m., *J. Hers*, no. 975, October 13, 1919; Lushih, Lao kiun shan, alt. 2000 m., *J. Hers*, no. 1222, September 21, 1919; Sung hsien, Shih tze miao, alt. 1200 m., *J. Hers*, no. 1243, September 25, 1919; without precise locality, *J. Hers*, no. 125, 1919.—See also Hers, l. c.

SHENSI: Tai pei shan, *W. Purdom*, no. 963, 1910.—See also Focke, l. c.

DISTRIBUTION: also Hupeh, Szechuan, Yunnan.

Rubus mesogaeus var. **oxycomus** Focke in Bot. Jahrb. XXIX. 399 (1900); XXXVI. beibl. LXXXII. 56 (1905).

SHENSI: Tue lian pin and Ki fon shan, *G. Giraldi*, nos. 1076 and 5219 (ex Focke, l. c.).

Rubus idaeus Linnaeus, Spec. 492 (1753).

CHILI: Hsiao Wu tai shan, alt. 1800–2600 m., *F. N. Meyer*, no. 1205, August 12, 1913; *J. Hers*, no. 1536, July 14, 1921; *N. H. Cowdry*, no. 1659, July 13, 1921; Hsiao Wu tai shan, Tieh ling sze, alt. 1300 m., *J. Hers*, no. 2121, October 7, 1922.

SHANSI: Wu chai hsien, Ta nan kow, alt. 2000–3000 m., *Tchuang Kieh*, Hers no. 2016, September 7, 1922.

DISTRIBUTION: also Europe, Northern Asia.

The specimens cited above do not seem to differ from typical *R. Idaeus;* of *R. idaeus* var. *strigosus* which occurs in Manchuria, Korea and Japan, I have seen no specimen from northern China and I have found no record except the following.

Rubus idaeus β. **strigosus** Maximowicz in Bull. Acad. Sci. St. Pétersb. XVII. 161 (1872); in Mél. Biol. VIII. 394 (1872).—Palibin in Act. Hort. Petrop. XIV. 116 (1895).

CHILI: Weichang (ex Palibin, l. c.).

DISTRIBUTION: Manchuria, Korea, Japan; also in North America.

Rubus acuminatissimus Hasskarl ? var. *kansuensis* Kanitz in Szechenyi, Keletazs. Utján. Tudom. Ered. II. 847 (Pl. Enum. 21) (1891); in Szechenyi, Wiss. Ergeb. Reise Ostas. II. 697 (1898).

KANSU: "inter Wej-ho et Tsing-tchou," no. 155 (ex Kanitz, l. c.).

This plant referred by Kanitz to the Javanese *R. acuminatissimus* I am unable to place; it is not at all probable that a Kansu plant belongs to a Javanese species and therefore I cannot consider Kanitz's determination as correct. I have seen no specimen of *R. acuminatissimus* Hasskarl, but judging from the description I do not think it impossible that Kanitz had a specimen of *R xanthocarpus* Bur. & Franch. before him.

There are three specimens collected by Hers, nos. 635, 1536 and 2714, the first with young flower-buds, the others sterile, which are too incomplete for determination.

Potentilla fruticosa Linnaeus, Spec. 495 (1753).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 262 (Pl. David. I. 110) (1883).—Hemsley in Jour. Linn. Soc. XXIII. 243 (1887).—Kanitz in Szechenyi, Keletazs. Utján. Tudom. Ered. II. 809 (Pl. Enum. 21) (1891); in Szechenyi, Wiss. Ergeb. Reise Ostas. II. 732 (1898).—Palibin in Act. Hort. Petrop. XIV. 117 (1895).—Pritzel in Bot. Jahrb. XXIX. 402 (1900); XXXVI. beibl. LXXXII. 56 (1905).—Rehder & Wilson in Sargent, Pl. Wilson. II. 301 (1915).—Limpricht, Bot. Reis. Hochgeb. Chin. Ost-Tib. 407 (1922).

CHILI: Weichang, *W. Purdom*, no. 127, 1909.—See also Franchet, l. c., Hemsley, l. c., Palibin, l. c., Rehder & Wilson, l. c., and Limpricht, l. c.

SHENSI: several localities, *G. Giraldi* (ex Pritzel, l. c.).

KANSU: ex Kanitz, l. c.

DISTRIBUTION: northern and central Asia, Europe, North America.

It is doubtful if typical *P. fruticosa* occurs in northern China. The only specimen cited above has the glabrate leaves of var. *davurica* but the shape of the outer sepals is too narrow and the color of the flowers is not recognizable with certainty.

The specimens enumerated under *P. fruticosa* by the authors quoted above are probably referable to different varieties.

Potentilla fruticosa var. **parvifolia** Wolf in Bibl. Bot. XVI. 58 (Monog. Potent.) (1908).—Rehder & Wilson in Sargent, Pl. Wilson. II. 304 (1915).

Potentilla fruticosa var. *ochreata* Hooker f., Fl. Brit. Ind. II. 347 (1878).—Kanitz in Szechenyi, Keletazs. Utján. Tudom. Ered. II. 809 (Pl. Enum. 21) (1891); in Szechenyi, Wiss. Ergeb. Reise Ostas. II. 697 (1898).—Non Lehmann.

KANSU: Min chow and Choni districts, alt. 3000–3300 m., *W. Purdom*, no. 821, 1910 (plants raised from seeds sent under no. 821^{xxx} are growing at the Arnold Arboretum).—See also Rehder & Wilson, l. c., and Kanitz, l. c.

DISTRIBUTION: also Siberia, Central Asia and Himalayas.

Potentilla fruticosa var. **mandshurica** Maximowicz in Bull. Acad. Sci. St. Pétersb. XIX. 164 (1874); in Mél. Biol. VIII. 158 (1873).

Potentilla davurica var. *mandshurica* Wolf in Bibl. Bot. XVI. 61 (Monog. Potent.) (1908).—Limpricht, Bot. Reis. Hochgeb. Chin. Ost.-Tib. 407 (1922).

SHANSI: Da dung fu (ex Limpricht, l. c.).

DISTRIBUTION: also Szechuan; Manchuria.

Potentilla fruticosa var. **davurica** Lehmann, Monog. Potent. 32 (1820).

Potentilla davurica Nestler, Monog. Potent. 31, tab. 1 (1816).—Palibin in Act. Hort. Petrop. XIV. 117 (1895).—Farrer in Jour. Roy. Hort. Soc. XLII. 90 (1916).—Limpricht, Bot. Reis. Hochgeb. Chin. Ost.-Tib. 407 (1922).

Potentilla fruticosa var. *Veitchii* Rehder & Wilson in Sargent, Pl. Wilson. II. 303 (1915), pro parte, quoad plantas e China bor.—Non Bean.

CHILI: Hsiao Wu tai shan, alt. 3000 m., *F. N. Meyer*, no. 1176 (108), August 12, 1913; *J. Hers*, no. 1540, July 14, 1921.—See also Palibin, l. c., Limpricht, l. c., and Rehder & Wilson, l. c.

SHANSI: Da Wu tai shan (ex Limpricht, l. c.).

SHENSI: Tai pei shan, mountain slopes up to alt. 3300 m., *W. Purdom*, nos. 396, 396^{a}, 396^{xxx}, 1910.— See also Limpricht, l. c., and Rehder & Wilson, l. c.

KANSU: Valley of Tow River, alt. 3000–3300 m., *W. Purdom*, no. 819, 1910.—See also Rehder & Wilson, l. c., and Farrer, l. c.

DISTRIBUTION: also Hupeh, Szechuan, Yunnan; Transbaicalia, Manchuria.

This variety is very closely related to var. *Veitchii* (Wils.) Bean and seems gradually to pass into it by intermediate forms. Var. *davurica* is chiefly characterized by rather small glabrous or glabrate leaves dark green above, glaucescent beneath and without conspicuous lateral veins, by the broad and short outer sepals and the conspicuous tuft of white hairs at the end of the stipules, while var. *Veitchii* has larger leaves more or less furnished with long silky hairs on both sides, dull green above and lighter green and with rather prominent lateral veins beneath, the outer sepals usually about as long as the inner sepals, and it is generally a taller more vigorous plant.

Potentilla eriocarpa Wallich, Cat. Pl. Ind. Or. 28, no. 1012 (1828), nomen.—Hooker fil., Fl. Brit. Ind. II. 348 (1879).—Pritzel in Bot. Jahrb. XXIX. 403 (1900).

SHENSI: Tai pei shan, *G. Giraldi*, nos. 1003, 1683 (ex Pritzel, l. c.).
DISTRIBUTION: also Himalayas.

Rosa multiflora Thunberg, Fl. Jap. 214 (1784).—Hemsley in Jour. Linn. Soc. XXIII. 253 (1887), pro parte.—Ito in Tokyo Bot. Mag. XIV. 133 (1900).—Gilg in Bot. Jahrb. XXXIV. beibl. LXXV. 40 (1904).

Rosa multiflora var. *adenophora* Franchet in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 216 (1884).—Non Franchet & Savatier.

Rosa multiflora Thunb. *var.* Dingler in Bot. Centralbl. Beih. XXXVII. abt. II. 135 (1919).

SHANTUNG: Chifu, ravines in hills, *N. H. Cowdry*, no. 576, July, 1920.—See also Hemsley, l. c., Gilg, l. c., Franchet, l. c., Ito, l. c., and Dingler, l. c.

Cowdry's specimen is in young fruit but as Gilg states that the flowers are white, the Shantung plant apparently represents typical *R. multiflora*.

Rosa multiflora Thunb. var. **cathayensis** Rehder & Wilson in Sargent, Pl. Wilson. II. 304 (1915).—F. N. Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds Pl. Imp. XL. 33, no. 38823 (1917).—Hers in Jour. N. China Branch R. As. Soc. LIII. 115 (1922); Liste Ess. Lign. Honan, 26 (1922).

Rosa multiflora Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 100 (Enum. Pl. Chin. Bor. 26) (1833).—Hemsley in Jour. Linn. Soc. XXIII. 253 (1887), pro parte.—Crépin in Bull. Soc. Bot. Ital. 1897, 230.—Non Thunberg.

Rosa cathayensis Bailey, Gent. Herb. I. 29 (1920).

HONAN: Chang mao, *J. Hers*, no. 45, May 10, 1919; Sia shih, *J. Hers*, no. 343, May 25, 1921; Yung ning, Tsi li ping, *J. Hers*, nos. 451, 482, May 22, 1919; Yung ning, Yo tze ping, alt. 1000 m., *J. Hers*, no. 829, October 4, 1919; Lushih, Ta she ho, *J. Hers*, no. 998, October 13, 1919; Sung hsien, San kuan miao, alt. 1000 m., *J. Hers*, no. 1296, September 27, 1919; Tsi yuan hsien, Tien tan shan, *J. Hers*, no. 1740, September 21, 1921; Tsi yuan hsien, alt. 500 m., *J. Hers*, no. 2672, August 23, 1923; Chi kung shan, *L. H. Bailey*, June 14, 1917; Cheng chow, planted, *J. Hers*, no. 1979, August 22, 1922; from a plant introduced from the hills, *J. Hers*, nos. 2582, 2583, August 2, 1923.—See also Hers, l. c., and Bailey, l. c.

NORTHERN KIANGSU: without precise locality, *J. Hers*, no. 1038.

SHENSI: Tai pei shan, *W. Purdom*, no. 964, 1910.—See also Crépin, l. c., and F. N. Meyer, l. c.

KANSU: without precise locality, *W. Purdom*, no. 536 (seeds only; plants growing in the Arnold Arboretum).—See also Rehder & Wilson, l. c.

DISTRIBUTION: also Chekiang, Fokien, Kiangsi, Hunan, Hupeh, Szechuan, Yunnan.

Rosa multiflora var. **carnea** Thory in Redouté, Roses, II. 67, t. (1821).—Rehder & Wilson in Sargent, Pl. Wilson. II. 305 (1915).

Rosa sp. F. N. Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds Pl. Imp. XV. 58, no. 23035 (1909).

CHILI: Tientsin, *F. N. Meyer*, no. 697, April 3, 1908 (cuttings or seeds only; plants growing in Chico, Calif. [Herb. U. S. Dept. Agric.]).—See also F. N. Meyer, l. c.

HONAN: Cheng chow, cultivated, *J. Hers*, no. 2511, June 1, 1923.

DISTRIBUTION: also cultivated in other provinces of China.

Rosa multiflora var. **Praegeri** Dingler in Bot. Centralbl. Beih. XXXVII. abt. II. 135, tab. 6A (1919).

SHANTUNG: Litsun valley, *Praeger* (ex Dingler, l. c.).

According to the description it differs from var. *cathayensis* chiefly in its smaller broad and obtuse leaflets pubescent on both sides, in the white flowers and in its prostrate habit.

Rosa Rubus Léveillé & Vaniot in Bull. Soc. Bot. France, LV. 55 (1908).

Rosa moschata var. *micrantha* Crépin in Bull. Soc. Bot. Belg. XVIII. 302 (Prim. Monog. Ros. 548) (1879); in Bull. Soc. Bot. Ital. 1897, 231.

SHENSI: Niu pei shan, alt. 700 m., *J. Hers*, no. 2456, October 11, 1922.—See also Crépin, l. c.

Hers' no. 2456 which is in ripe fruit differs from the typical form in its somewhat less pubescent and less coarsely serrate leaflets with the veins more prominent beneath.

Rosa moschata Miller, Dict. ed. 8, no. 13 (1768).—Dingler in Bot. Centralbl. Beih. XXXVII. abt. II. 135 (1919).

SHANTUNG: Litsun, alt. 300 m., *M. Du Bois-Raymond*, no. 203 (ex Dingler, l. c.).

The plant certainly does not belong to the true *R. moschata*, but may possibly be *R. Gentiliana* Léveillé & Vaniot, the type of which came from Kiangsu.

Rosa Maximowicziana Regel in Act. Hort. Petrop. V. 378 (1877).—Cowdry in Jour. N. China Branch R. As. Soc. LIII. 164 (Pl. Peitaiho) (1922).

CHILI: Pei tai ho, banks and rocks (ex Cowdry, l. c.).

DISTRIBUTION: also Manchuria, Korea.

Rosa Wichuraiana Crépin in Bull. Soc. Bot. Belg. XXV. 189 (1886).—Rehder & Wilson in Sargent, Pl. Wilson. II. 335 (1915).

Rosa Luciae var. *poteriifolia* Franchet & Savatier, Enum. Pl. Jap. II. 345 (1879).—Crépin in Bull. Soc. Bot. Belg. XVIII. 286 (Prim. Monog. Ros. 532) (1879).

SHANTUNG: Chifu, *H. Wawra* (ex Crépin, l. c. [1879]).

DISTRIBUTION: also Kwangtung, Kwangsi; Korea, Japan, Formosa.

Rosa microcarpa Lindley, Monog. Ros. 130, t. 18 (1820).—Crépin in Bull. Soc. Bot. Belg. XIV. 164 (Prim. Monog. Ros. 368) (1875).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 270 (Pl. David. I. 118) (1883).

? SHENSI: *A. David* (ex Crépin, l. c.).

DISTRIBUTION: Chekiang, Fokien, Kiangsi, Hupeh, Szechuan, Kweichou.

Crépin says that David's specimens he saw were without locality, but that they probably were collected in Shensi. Franchet (l. c.) states that he did not find the specimens referred to by Crépin in the collections of the Museum.

Rosa Banksiae Aiton, Hort. Kew. ed. 2, III. 258 (1811).—Dingler in Bot. Centralbl. Beih. XXXVII. abt. II. 135 (1919).—Hers in Jour. N. China Branch R. As. Soc. LIII. 115 (1922); Liste Ess. Lign. Honan, 26 (1922).

SHANTUNG: Tsimo, ? cultivated (ex Dingler, l. c.).

HONAN: cultivated (ex Hers, l. c.).

DISTRIBUTION: also cultivated in other provinces of China and in Japan.

Rosa Banksiae var. **normalis** Regel, Tent. Ros. Monog. 91 (1877); in Act. Hort. Petrop. v. 376 (1878).—F. N. Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds Pl. Imp. XLIII. 77, no. 40768 (1918).

Rosa Banksiae Crépin in Bull. Soc. Bot. Belg. XIV. 162 (Prim. Monog. Ros. 366) (1875); in Bull. Bot. Soc. Ital. 1897, 231.—Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 267 (Pl. David. I. 115) (1883).—Hemsley in Jour. Linn. Soc. XXIII. 248 (1887).—Farrer in Jour. Roy. Hort. Soc. XLII. 107 (1916).—Non Aiton.

SHENSI: *A. David* (ex Crépin, l. c. [1875], Franchet, l. c., and Hemsley, l. c.); several localities, *G. Giraldi* (ex Crépin, l. c. [1897]).

KANSU: near Cheng hsien, *F. N. Meyer*, no. 1960, September 30, 1914 (Herb. U. S. Dept. Agric.); Feng shan ling (ex Farrer, l. c.).

DISTRIBUTION: also Hupeh, Szechuan and Yunnan.

Rosa Roxburghii Tratt. f. **normalis** Rehder & Wilson in Sargent, Pl. Wilson. II. 319 (1915).

Rosa microphylla Crépin in Bull. Soc. Bot. Ital. 1897, 234.—Non Desfontaines, vix Roxburgh.

SHENSI: Ko lu pas, *G. Giraldi*, nos. 23, 27 (ex Crépin, l. c.).

DISTRIBUTION (including varieties): also Hupeh, Szechuan, Kweichou, Yunnan; Japan.

Rosa chinensis Jacquin, Obs. Bot. III. 7, t. 55 (1768).

Rosa indica Loureiro, Fl. Cochinch. 323 (1790).—Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 100 (Enum. Pl. Chin. Bor. 26) (1833).—Kanitz in Szechenyi, Keletazs. Utján. Tudom. Ered. II. 810 (Pl. Enum. 22) (1891); in Szechenyi, Wiss. Ergeb. Reise Ostas. II. 698 (1898).—Crépin in Bull. Soc. Bot. Ital. 1897, 231.—Ito in Tokyo Bot. Mag. XIV. 134 (1900).—Hers in Jour. N. China Branch R. As. Soc. LIII. 115 (1922); Liste Ess. Lign. Honan, 26 (1922).—Non Linnaeus.

CHILI: cultivated (ex Bunge, l. c.).

SHANTUNG: cultivated (ex Ito, l. c.).

HONAN: cultivated (ex Hers, l. c.).

SHENSI: cultivated (ex Crépin, l. c.).

KANSU: cultivated (ex Kanitz, l. c.).

DISTRIBUTION: also cultivated in other Chinese provinces; the spontaneous form with single flowers occurs in Szechuan and Hupeh.

Rosa rugosa Thunberg, Fl. Jap. 213 (1784).—Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 100 (Enum. Pl. Chin. Bor. 26) (1833).—Franchet in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 214 (1884).—Hemsley in Jour. Linn. Soc. XXIII. 253 (1887).—Faber in Denkschr. Entwickel. Kiautschou, 32 (1898).—Ito in Tokyo Bot. Mag. XIV. 133 (1900).—Gilg. in Bot. Jahrb. XXXIV. beibl. LXXV. 40 (1904).—Hers in Jour. N. China Branch R. As. Soc. LIII. 115 (1922); Liste Ess. Lign. Honan, 26 (1922).

Rosa rugosa β. *ferox* C. A. Meyer in Mém. Acad. Sci. St. Pétersb. sér. 6, VI. 32 (Ueber Zimmtros.) (1847).—Dingler in Bot. Centralbl. Beih. XXXVII. abt. II. 136 (1919).

Rosa rugosa f. *amurensis* Maximowicz apud Debeaux in Act. Soc. Linn. Bordeaux, XXXI. 152 (Fl. Tché-foû, 57) (1876).

CHILI: cultivated (ex Bunge, l. c., and Hemsley, l. c.).

SHANTUNG: Chifu, roadsides, *N. H. Cowdry*, no. 578, July 5, 1920 (sterile).—See also Franchet, l. c., Hemsley, l. c., Faber, l. c., Ito, l. c., Gilg, l. c., Dingler, l. c., and Debeaux, l. c.

HONAN: cultivated (ex Hers, l. c.).

DISTRIBUTION: also Manchuria, Kamchatka, Korea, Japan.

This Rose seems to occur spontaneously only in Shantung; the cultivated plants recorded from Chili and Honan probably belong to the double-flowered form of var. *Chamissoniana*.

Rosa rugosa var. **Chamissoniana** C. A. Meyer in Mém. Acad. Sci. St. Pétersb. sér. 6, VI. 34 (Ueber Zimmtros.) (1847).—Dingler in Bot. Centralbl. Beih. XXXVII. abt. II. 136 (1919).

SHANTUNG: Chifu, roadsides, *N. H. Cowdry*, no. 577, July, 1920 (sterile).—See also Dingler, l. c.

DISTRIBUTION: also Kamchatka.

Rosa rugosa var. **Chamissoniana f. rubro-plena,** comb. nov.

Rosa rugosa var. *floribus plenis* Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 268 (Pl. David. I. 116) (1883).

Rosa rugosa var. *Chamissoniana* Rehder & Wilson in Sargent, Pl. Wilson. II. 321 (1915).—Vix C. A. Meyer.

Rosa rugosa var. *rubro-plena* Rehder in Bailey, Stand. Cycl. Hort. V. 2992 (1916).

CHILI: Peking, cultivated (ex Franchet, l. c.).

DISTRIBUTION: cultivated and escaped from cultivation in Hupeh; also cultivated in other provinces of China; probably the cultivated plants enumerated under *R. rugosa* belong here.

Rosa davurica Pallas, Fl. Ross. I. pt. 2, 61 (1788).—Crépin in Bull. Soc. Bot. Belg. XIV. 33, 38 (Prim. Ros. Monog. 327, 332) (1875).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 268 (Pl. David. I. 116) (1883).—Hemsley in Jour. Linn. Soc. XXIII. 249 (1887).—Rehder & Wilson in Sargent, Pl. Wilson. II. 340 (1915).

CHILI: west of Weichang, *W. Purdom*, no. 107, 1910; near San tung ying, stony places, *F. N. Meyer*, no. 973, May 31, 1913; Hsiao Wu tai shan, *F. N. Meyer*, no. 1240 (105), August 20, 1913; *J. Hers*, no. 1503, July 14,

1921.—See also Crépin, l. c., Franchet, l. c., Hemsley, l. c., and Rehder & Wilson, l. c.

DISTRIBUTION: also Dahuria, Mongolia, Korea.

Rosa banksiopsis Baker in Willmott, Gen. Rosa, II. 503 (1914).—Rehder & Wilson in Sargent, Pl. Wilson. II. 322 (1915).—Hers in Jour. N. China Branch R. As. Soc. LIII. 115 (1922); Liste Ess. Lign. Honan, 26 (1922).

? *Rosa macrophylla* Crépin in Bull. Soc. Bot. Ital. 1897, 231; ? pro parte.—Non Lindley.

HONAN: Teng feng hsien, Yu tai shan, alt. 800 m., *J. Hers*, nos. 238, 238[bis], April 23, 1919, no. 2783, September 27, 1923.—See also Hers, l. c.

SHENSI: "Kin tan san," *G. Giraldi*, July 14, 1897; Moutan shan, northwest of Han cheng hsien, alt. 1500 m., *W. Purdom*, no. 366, May 29, 1910; valley leading to Tai pei shan, alt. 2300 m., *W. Purdom*, no. 424, July 1, 1910; Tai pei shan, *W. Purdom*, no. 1119, 1910.—See also Crépin, l. c., and Rehder & Wilson, l. c.

DISTRIBUTION: also Hupeh, Szechuan.

The specimens from the Yu tai shan, Honan, differ from typical *R. banksiopsis* in the suborbicular to broad-ovate leaflets not exceeding 1.5 cm. in length, in the few-flowered corymbs and in the very short pedicels, and resemble in these characters *R. Giraldii* Crép., but they have the large broad bracts, glabrous inflorescence and the texture and color of the leaves of *R. banksiopsis*. Purdom's no. 1119 is a peculiar apparently abnormal form with an extremely large and loose inflorescence measuring about 20 cm. in diameter.

Rosa Davidii Crépin in Bull. Soc. Bot. Belg. XIII. 253 (Prim. Ros. Monog. 260) (1874).

KANSU: Tsing shui hsien, Tsao chuan pu, alt. 1500 m., *J. Hers*, no. 2403, July 10, 1922.

DISTRIBUTION: also Szechuan.

The Kansu specimen resembles in the rather dense pubescence of the sepals, calyx-tube and pedicels Wilson's no. 3585 from Wa-shan, Szechuan.

Rosa acicularis Lindley, Monog. Ros. 44, t. 8 (1820).—Hemsley in Jour. Linn. Soc. XXIII. 248 (1887).

CHILI: Hsiao Wu tai shan, alt. 3000 m., *F. N. Meyer*, no. 1365, August 29, 1913 (Herb. U. S. Dept. Agric.).—See also Hemsley, l. c.

DISTRIBUTION: northern Europe and northern Asia to Korea; also North America.

Meyer's no. 1365 is the only specimen of this widely distributed and variable Rose I have seen from China; its stem and branchlets are densely bristly; the leaves are 5-foliolate with the leaflets gland-dotted and glabrous beneath except scattered villose hairs on the midrib; the solitary subglobose to globose-ovoid fruits are borne on glabrous pedicels about 1 cm. long.

Rosa bella Rehder & Wilson in Sargent, Pl. Wilson. II. 341 (1915).

? *Rosa macrophylla* δ. *hypoleuca* Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 267 (Pl. David. I. 115) (1883).

Rosa sp. F. N. Meyer in U. S. Dept. Agric. Invent. Seeds Pl. Imp. XXXVII. 75, no. 36857, 36858 (1916).

Rosa Sweginzowii Hers in Jour. N. China Branch R. As. Soc. LIII. 115 (1922); Liste Ess. Lign. Honan, 26 (1922).—Non Koehne.

CHILI: Po hua shan, *J. Hers*, nos. 1438, 1671, July 1 and September 9, 1921; alt. 1000–2000 m., *J. Hers*, no. 2233, October 12, 1922; Hsiao Wu tai shan, alt. 1600 m., *F. N. Meyer*, nos. 1239 and 1256, August 20 and 21, 1913; *J. Hers*, no. 1486, July 14, 1921; Hsiao Wu tai shan, Tieh ling sze, alt. 1300 m., *J. Hers*, nos. 2122, 2130, October 7, 1922; Kalgan, *N. H. Cowdry*, no. 1974, August 30, 1921; without precise locality, *Père Chanet*, nos. 10, 38, 1918.—See also Franchet, l. c., and Meyer, l. c.

HONAN: Lushih, Lao kiun shan, alt. 2000 m,. *J. Hers*, no. 1162, September 21, 1919; Lushih, Hiung eul shan, alt. 1400 m., *J. Hers*, no. 896, October 10, 1919; Tsi yuan hsien, Tien tan shan, *J. Hers*, no. 1812, September 21, 1921.—See also Hers, l. c.

SHANSI: Wu chai hsien, Ta nan kow, alt. 2000–3000 m., *Tchuang Kieh*, Hers no. 2001, September 7, 1922; Wu tai shan, alt. 1600 m., *J. Hers*, no. 2617, July 29, 1923; Nan fang shan, common between 2000 and 3000 m., flowers dark red, *J. Hers*, no. 2717, September 22–30, 1923.

SHENSI: Lung chow, Li kia po, alt. 1400 m., *J. Hers*, no. 2385, July 4, 1922.

This species seems to be the most common and most widely distributed Rose in northeastern China. Most specimens differ from the type in the pubescent midrib of the underside of the leaves, but otherwise they agree with it. The specimen from Shensi has the leaves densely grayish pubescent beneath and slightly pubescent above and represents probably a distinct form, if not a different species. In the short pedicels which like the calyx-tube are densely stipitate-glandular and glandular-setose, *R. bella* resembles *R. Sweginzowii* Koehne, but the leaves are simply serrate and the sepals entire. From *R. acicularis* Lindl. it differs in the smaller more numerous leaflets glaucescent beneath and in the short-pedicelled usually clustered flowers and the densely glandular-stipitate pedicel and calyx-tube; by the last named character it also differs from *R. Moyesii* Hemsl. & Wils. which besides has more numerous, more acute and rather finely serrate leaflets.

Rosa bella f. **pallens** Rehder & Wilson in Sargent, Pl. Wilson. II. 342 (1915).

This form with pale rose flowers was raised from the same seed as the type and probably occurs with the red-flowered type in other localities.

Rosa bella var. **mongolica**, comb. nov.

Rosa macrophylla α. *mongolica* Franchet in Nouv. Arch. Mus. Paris, sér. 2, 267 (Pl. David. I. 115) (1883).

Rosa macrophylla Hemsley in Jour. Linn. Soc. XXIII. 251 (1887), quoad specimen Davidii.—Non Lindley.

CHILI: Kalgan, on Mt. Gulick, *N. H. Cowdry*, no. 1843, July 7, 1921; Po hua shan ("Ipe hoa chan"), *A. David*, no. 2248 (ex Franchet, l. c.).

This Rose differs at the first glance strikingly from typical *R. bella* in its very small leaflets pubescent beneath and occasionally 11 in number, but in Meyer's no. 1239 from Hsiao Wu tai shan part of the leaves on one of the branches have the leaflets as small and pubescent beneath, though they are never more than 9-foliolate, and Cowdry's no. 1974 from Kalgan has also rather small leaflets 1–2 cm. long, Cowdry's no. 1843 agrees well with Franchet's description but the leaflets can hardly be called doubly serrate, though the teeth have occasionally on some leaves more often than on others a minute tooth on one side.

Rosa Sweginzowii Koehne in Fedde, Rep. Spec. Nov. VIII. 22 (1910).—Rehder & Wilson in Sargent, Pl. Wilson. II. 324 (1915).

SHENSI: Lung chow, Li kia po, alt. 1400 m., *J. Hers*, no. 2384, July 4, 1922.

KANSU: Min chow district, alt. 3000 m., *W. Purdom*, no. 1059, 1910; without precise locality, *W. Purdom*, no. 1143, 1910.—See also Rehder & Wilson, l. c.

DISTRIBUTION: also Szechuan.

The original description of this species was based on cultivated plants raised from seed supposed to have been collected in Kansu; the subsequent discovery of the plant in Kansu shows that this supposition was correct.

Rosa Biondii Crépin in Bull. Soc. Bot. Ital. 1897, 233.

SHENSI: "Gniu-ju," *G. Giraldi*, no. 47 (ex Crépin, l. c.).

KANSU: Min chow, alt. 2600 m., *W. Purdom*, no. 1144, 1910.

I refer Purdom's material with some doubt to *R. Biondii* of which I have seen no specimen; it agrees fairly well with Crépin's description although the bracts at the base of the pedicels are rather narrow, not "très dilatées" as described by Crépin, and the number of leaflets is 7 or 9, very rarely 5, not 5 or 7. In the narrow stipules it agrees with *R. Murielae* Rehder & Wilson, but that species has more numerous and smaller leaflets and an inflorescence of usually several flowers.

Possibly identical with one of the four preceding species and probably with *R. bella* is the undescribed *R. Przewalskii* Regel ined. apud Bretschneider (Hist. Eur. Bot. Discov. China, 975, 1053 [1898], nomen) collected by Przewalski in 1880 on the Djakhar Mountain, south of Kui te, Kansu, and by Bretschneider on the Peking mountains. According to Bretschneider there is a note by Crépin on the label stating that it seems a form of *R. macrophylla* Lindl.

Rosa Giraldii Crépin in Bull. Soc. Bot. Ital. 1897, 232.—Rehder & Wilson in Sargent, Pl. Wilson. II. 328 (1915).

SHENSI: "Monte Kan-y-san ad ovest del Lao-y-san," *G. Giraldi*, June 11–12, 1897.—See also Crépin, l. c., and Rehder & Wilson, l. c.

DISTRIBUTION (including varieties): also Hupeh, Szechuan.

Rosa Prattii Hemsley in Jour. Linn. Soc. XXIX. 307, fig. 30 (1892).

SHENSI: Tai pei shan, *W. Purdom*, no. 1124, 1910.

DISTRIBUTION: also Szechuan.

The Shensi specimen differs from the typical form in its very bristly calyx and pedicels, in the rather more dilated stipules and the solitary flowers.

Rosa Hugonis Hemsley in Bot. Mag. CXXXI. t. 8004 (1905).—Rehder & Wilson in Sargent, Pl. Wilson. II. 330 (1915).

Rosa xanthina Crépin in Bull. Soc. Bot. Ital. 1897, 223; synon. exclud.—Non Lindley.

SHENSI: various localities, *G. Giraldi* (ex Crépin, l. c.).—See also Hemsley, l. c.

DISTRIBUTION: also Szechuan.

I have seen none of Giraldi's specimens, but a cultivated plant (in Herb. Zabel) raised from seed collected by Giraldi is undoubtedly *R. Hugonis* which probably extends north as far as the southern slope of the Tsin ling shan. In the absence of vigorous shoots showing the presence of bristles it is often very difficult to distinguish *R. Hugonis* from *R. xanthina* and one has to depend on the generally more sharply serrate and more numerous leaflets glabrous or nearly so even when young, and on the more slender-pedicelled paler colored flowers of *R. Hugonis*.

Rosa xanthina Lindley, Monog. Ros. 132 (1820).—Hemsley in Jour. Linn. Soc. XXIII. 254 (1887).—Bretschneider, Hist. Eur. Bot. Discov. China, 861 (1898).—? F. N. Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds Pl. Imp. XIII. 170, no. 21620 (1908).—Rehder & Wilson in Sargent, Pl. Wilson. II. 342 (1915).—Hers in Jour. N. China Branch R. As. Soc. LIII. 115 (1922); Liste Ess. Lign. Honan, 26 (1922).

Rosa pimpinellifolia Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 100 (Enum. Pl. Chin. Bor. 26) (1833).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 471 (Ind. Fl. Pekin.) (1859).—Hemsley in Jour. Linn. Soc. XXIII. 253 (1887).—Bretschneider, Hist. Eur. Bot. Discov. China, 333 (1898).—Non Linnaeus.

Rosa sp. F. N. Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds Pl. Imp. XII. 37, no. 17469 (1907).

Rosa xanthinoides Nakai in Tokyo Bot. Mag. XXXII. 218 (1918); in Fl. Sylv. Kor. VII. 33, t. 6 (1918).

CHILI: Peking, in gardens, *F. N. Meyer*, nos. 67 and 68, 1906 (only cuttings or plants sent and grown by the Department of Agriculture).—See also Meyer, l. c. (1907), Bunge, l. c., Maximowicz, l. c., and Hemsley, l. c.

SHANTUNG: Shushan, *F. N. Meyer*, no. 745[a], August 23, 1907 (seeds only, plants with semi-double flowers raised from the seed and growing at the Arnold Arboretum).—See also Meyer, l. c. (1908) and Rehder & Wilson, l. c.

HONAN: cultivated (ex Hers, l. c.).

DISTRIBUTION: also cultivated in Korea.

As this is the only double-flowered yellow Rose we know from northern China, there can hardly be any doubt that it represents Lindley's *R. xanthina* based on a Chinese drawing and very briefly described. The plant referred to by Bunge as *R. pimpinellifolia* and stated to be represented by a cultivated variety "floribus majusculis sulphureis" is probably the double-flowered form and not the single-flowered wild form.

Rosa xanthina f. spontanea Rehder, nom. nov.

Rosa xanthina Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 269, t. 15, fig. 2 (Pl. David. I. 117) (1883).—F. N. Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds Pl. Imp. XIII. 170, no. 21620 (1908).—Dingler in Bot. Centralbl. Beih. XXXVII. abt. II. 136 (1919).—Vix Lindley.

Rosa eglanteria Graebner in Bot. Jahrb. XXXIV. beibl. LXXV. 40 (1904).—Non Linnaeus.

Rosa xanthina f. *normalis* Rehder & Wilson in Sargent, Pl. Wilson. II. 342 (1915); quoad syn. Franchetii.—Hers in Jour. N. China Branch R. As. Soc. LIII. 115 (1922); Liste Ess. Lign. Honan, 26 (1922).

Rosa sp. F. N. Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds Pl. Imp. XL. 33, no. 38821 (1917).

CHILI: Kalgan, mountain side near Jen tou shan, *N. H. Cowdry*, no. 1498, July 2, 1921.

SHANTUNG: Tsing tau and Tsang kou (ex Graebner, l. c., and Dingler, l. c.); Shu shan (ex Meyer, l. c.).

HONAN: Chang mao, alt. 600 m., *J. Hers*, nos. 43, 44, May 10, 1919; Sia shih, *J. Hers*, no. 336, April 24, 1921.—See also Hers, l. c.

SHANSI: Fen chow, *J. Hers*, no. 1906, April 20, 1922; Wu chai hsien, Ta nan kow, alt. 2000–3000 m., *Tchuang Kieh*, Hers no. 2048, September 7, 1922; Nan yang shan, alt. 1000–2500 m., *J. Hers*, no. 2716, September 22–30, 1923.

SHENSI: Yenan fu, *W. Purdom*, no. 339, 1910; Ta hua shan, *F. N. Meyer*, no. 2094[a], December 29, 1913 (seeds only; plants growing at Bell, Maryland; in herb. U. S. Dept. Agric.).

The specimens cited above represent apparently the spontaneous form of the double-flowered *R. xanthina;* they agree with the specimens of the double-flowered form in shape and serration and in the pubescence of the leaflets which are usually villose beneath at least when young and glandless, rarely quite glabrous. In Plantae Wilsonianae (l. c.) this spontaneous form is confused with *R. Ecae* which has narrower leaflets, obtusely and more or less doubly serrate from near the base and glandular-dotted beneath but otherwise glabrous.

The plant growing near Shu shan, Shantung, is according to Meyer's note the wild single-flowered form, but the cultivated plants supposed to have been introduced by Meyer from that locality have semi-double flowers. Hers' no. 336 from Sia shih, Honan, is remarkable for its very pubescent leaves, the leaflets being densely long-villose beneath, sparingly so above and the petioles are also covered with long villose hairs. In most plants the pubescence nearly disappears at maturity or it may be even entirely absent as in Hers' no. 2048 and 2716 from Shansi and in Cowdry's no. 1498 from Chili.

Rosa Ecae Aitchison in Jour. Linn. Soc. XVIII. 54 (1880); XIX. 162, t. 8 (1882).—Kanitz in Szechenyi, Keletazs. Utján. Tudom. Ered. II. 810 (Pl. Enum. 22) (1891); in Szechenyi, Wiss. Ergeb. Reise Ostas. II. 698 (1898).

Rosa xanthina f. *normalis* Rehder & Wilson in Sargent, Pl. Wilson. II. 342 (1915), synon. exceptis.

Rosa Sweginzowii F. N. Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds Pl. Imp. XLIII. 68, no. 40699 (1918).—Non Koehne.

HONAN: Hwei hsien, Shansi border, *J. Hers*, no. 709, June 19, 1919.

SHANSI: near Tsin tse, *F. N. Meyer*, no. 414, May, 1907; near Hsi po po, *F. N. Meyer*, no. 1700, July 10, 1914; Fen chow, *J. Hers*, no. 1905, April 20, 1922.

KANSU: San sze miau, *F. N. Meyer*, no. 2000, December 1, 1914 (leafless shoot with extremely broad-based spines; in Herb. U. S. Dept. Agric.); "ad monasterium Altin" (ex Kanitz, l. c.).—See also Meyer, l. c.

DISTRIBUTION: also Central Asia.

It is remarkable that this Central Asiatic species should range as far east as Shansi and Honan, but I am unable to find any character to distinguish the specimens cited above from those collected in Turkestan. From the two other yellow-flowered species of northern China *R. Ecae* is easily distinguished by the glandular dots on the under side of the leaflets and their doubly serrate glandular margin.

Rosa tsinlingensis Pax & K. Hoffmann in Limpricht, Bot. Reis. Hochgeb. Chin. Ost.-Tib. 414 (1922).

SHENSI: Tsin ling shan, southeast slope of Tai pei shan (ex Pax & K. Hoffmann, l. c.).

This species is said to be related to *R. graciliflora* Rehd. & Wils. and seems to differ according to the description chiefly in its mostly 13-foliolate leaves with reticulate leaflets and in the smaller white flowers.

Rosa omeiensis Rolfe in Bot. Mag. CXXXVIII. t. 8471 (1912).—Rehder & Wilson in Sargent, Pl. Wilson. II. 331 (1915).

Rosa sericea Crépin in Bull. Soc. Bot. Belg. XIV. 151, 155 (Prim. Monog. Ros. 355, 359) (1875); in Bull. Soc. Bot. Ital. 1897, 234.—Non Lindley.

SHENSI: Kian san, *G. Giraldi*, August 4, 1897; Kin tou san, *G. Giraldi*, July 11, 1897; Tai pei shan, *W. Purdom*, nos. 969, 970, 970[a], 1123, 1910; southeastern slope of Tai pei shan, alt. 2600–3000 m., *W. Purdom*, no. 430, July 5, 1910.—See also Rehder & Wilson, l. c., and Crépin, l. c. (1897).

KANSU: Min chow, alt. 2600–3000 m., *W. Purdom*, nos. 1055, 1056, 1126, 1910.—See also Rehder & Wilson, l. c., and Crépin, l. c. (1875).

DISTRIBUTION: also Hupeh, Szechuan, Yunnan.

Prunus salicina Lindley in Trans. Hort. Soc. VII. 239 (1830).—Koehne in Sargent, Pl. Wilson. I. 580 (1913).—Bailey, Gent. Herb. I. 29 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 113 (1922); Liste Ess. Lign. Honan, 22 (1922).

Prunus triflora Roxburgh, Hort. Bengal. 38 (1814), nomen nudum; Fl. Ind. ed. 2, II. 501 (1832), sphalmate "*trifolia.*"—Koehne in Sargent, Pl. Wilson. I. 276 (1912).

Prunus ? *domestica* Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 96 (Enum. Pl. Chin. Bor. 22) (1833).—Bretschneider in Jour. N. China Branch R. As. Soc. n. ser. XV. 149 (Early Eur. Res. China) (1880).—Non Linnaeus.

Prunus communis Maximowicz in Bull. Acad. Sci. St. Pétersb. XXIX. 89 (1883); in Mél. Biol. XI. 678 (1883).—Hemsley in Jour. Linn. Soc. XXIII. 218 (1887).—Faber in Denkschr. Entwickel. Kiautschou, 32 (1898).—Ito in Tokyo Bot. Mag. XIV. 135 (1900).—Pritzel in Bot. Jahrb. XXIX. 407 (1900).—Gilg in Bot. Jahrb. XXXIV. beibl. LXXV. 41 (1904).—Non Hudson.

CHILI: Hsiao Wu tai shan, *J. Hers*, nos. 1506, 1575, July 14 and 16, 1921; also cultivated (ex Bunge, l. c., Bretschneider, l. c., and Maximowicz, l. c.).—See also Hemsley, l. c.

SHANTUNG: ? cultivated (ex Faber, l. c., Ito, l. c., and Gilg, l. c.).

HONAN: Yung ning, Tsi li ping, alt. 1000 m., *J. Hers*, no. 478, May 22, and nos. 1336 and 1361, September 30, 1919; Lushih, Tang ho, alt. 1000 m., *J. Hers*, no. 950, October 11, 1919; Lao kiun shan, alt. 900 m., *J. Hers*, no. 1230, September 23, 1919; Chi kung shan, *L. H. Bailey*, June 18, 1917.—See also Bailey, l. c., and Hers, l. c.

SHANSI: Hia hsien, Huang lai kow, *J. Hers*, nos. 1841 and 1842, October 2, 1921; Wu tai shan, alt. 1600 m., *J. Hers*, no. 2637, July 31, 1923.

SHENSI: Lung chow, Kuan shan, alt. 2000 m., *J. Hers*, no. 2360, July 3, 1922.—See also Pritzel, l. c.

DISTRIBUTION: also Hupeh, Hunan, Szechuan, Yunnan; much cultivated in China and also in Japan, Korea and the Himalayas.

The specimen from Shensi which is sterile has remarkably small and narrow leaves about 4–5 cm. long and 1–1.8 cm. wide, but apparently belongs to *P. salicina.*

Prunus Simonii Carrière in Rev. Hort. 1872, 111, t.—Bretschneider, Hist. Eur. Bot. Discov. China, 829 (1898).

Persica Simonii Decaisne, Jard. Fruit. VII. 43 (1872–1875).

Prunus Persica γ. *necturina* Maximowicz in Bull. Acad. Sci. St. Pétersb. XXIX. 83 (1883); in Mél. Biol. XI. 669 (1883), pro parte, quoad synon. *Prunus Simonii* et *Persica Simonii.*

CHILI: cultivated near Peking (ex Bretschneider, l. c.).

Of this I have seen only cultivated plants originally introduced by G. E. Simon from China to France. According to Bretschneider the plant figured by Carrière seems to be the same as the one cultivated under the name "hung li."

Prunus mume Siebold & Zuccarini, Fl. Jap. I. 29, t. 11 (1836).—Bailey, Gent. Herb. I. 28 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 113 (1922); Liste Ess. Lign. Honan, 22 (1922).—Cowdry in Jour. N. China Branch R. As. Soc. LIII. 163 (1922).

CHILI: Pau shan, hillsides, *N. H. Cowdry*, no. 2164, May, 1921; Pei tai ho, Lotus hill (ex Cowdry, l. c.).

NORTHERN KIANGSU: Hsiao hsien, Huang tsang yu, *J. Hers*, no. 1046, May 26, 1919.

HONAN: Chi kung shan (ex Bailey, l. c.); without locality (ex Hers, l. c.).

DISTRIBUTION (including varieties): also Hupeh, Szechuan, Chekiang, Kwangtung; Formosa, Japan.

As the specimens cited above are in leaf only, their identification remains open to doubt. Maximowicz (in Bull. Acad. Sci. St. Pétersb. XXIX. 84; in Mél. Biol. XI. 672 [1883]) mentions a double-flowered form sent by Bretschneider from Peking where it is cultivated.

Prunus Armeniaca Linnaeus, Spec. 474 (1753).—Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 96 (Enum. Pl. Chin. Bor. 22) (1833).—Maximowicz in Bull. Acad. Sci. St. Pétersb. XXIX. 86 (1883); in Mél. Biol. XI. 674 (1883).—Debeaux in Act. Soc. Linn. Bordeaux XXXIII. 41 (Fl. Tien-tsin, 18) (1879).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 256 (Pl. David. I. 103) (1883).—Hemsley in Jour. Linn. Soc. XXIII. 217 (1887).—Bretschneider, Hist. Eur. Bot. Discov. China, 1052 (1898).—Faber in Denkschr. Entwickel. Kiautschou, 32 (1898).—Pritzel in Bot. Jahrb. XXIX. 407 (1900).—Gilg in Bot. Jahrb. XXXIV. beibl. LXXV. 41 (1904).—Koehne in Sargent, Pl. Wilson. I. 278 (1912).—Bailey, Gent. Herb. I. 28 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 113 (1922); Liste Ess. Lign. Honan, 22 (1922).

Armeniaca Davidiana Carrière in Rev. Hort. 1879, 236, fig. 46–48.—Bretschneider, Hist. Eur. Bot. Discov. China, 860 (1898).

CHILI: Hsiao Wu tai shan, *F. N. Meyer*, nos. 1238, 1255 and 1361, August 20, 21, and 29, 1913.—See also Bunge, l. c., Maximowicz, l. c., Debeaux, l. c., Hemsley, l. c., Bretschneider, l. c., and Koehne, l. c.

SHANTUNG: cultivated (ex Faber, l. c., and Gilg, l. c.).

HONAN: Hwei hsien, Pai yun sze, *J. Hers*, no. 793, June 15, 1919; Chuan pao shan, alt. 1500 m., *J. Hers*, no. 1106, October 17, 1919.—See also Bailey, l. c., and Hers, l. c.

SHANSI: Huai lai hsien, Liu sha chwang, alt. 800 m., *J. Hers*, no. 2077, October 3, 1922.

SHENSI: Tsin ling shan (ex Pritzel, l. c.); cultivated (ex Franchet, l. c.).

DISTRIBUTION: also Manchuria; cultivated in other Chinese provinces.

Prunus Armeniaca var. **ansu** Maximowicz in Bull. Acad. Sci. St. Pétersb. XXIX. 87 (1883); in Mél. Biol. XI. 676 (1883).—Ito in Tokyo Bot. Mag. XIV. 134 (1900) "*Anzu.*"—Koehne in Sargent, Pl. Wilson. I. 282 (1912).—Bailey, Gent. Herb. I. 28 (1920).

SHANTUNG: cultivated (ex Ito, l. c., and Koehne, l. c.).

NORTHERN KIANGSU: Liu lin shan, near Hai chow, *J. Hers*, no. 601, May 5, 1921.

DISTRIBUTION: also Korea; cultivated in Japan.

A supposed hybrid between *Prunus Armeniaca* and *P. salicina* is mentioned under the name "Plumcot" by F. N. Meyer (in U. S. Dept. Agr. Bur. Pl. Indust. Bull. CCIV. 22 [Agric. Explor. Orch. China] [1911]). He states that it is called "Lishing" by the Chinese and that about three varieties of it are grown in the Shantung province.

Prunus sibirica Linnaeus, Spec. 474 (1753).

Prunus Armeniaca var. *sibirica* K. Koch, Dendr. I. 88 (1869).—Maximowicz in Bull. Acad. Sci. St. Pétersb. XXIX. 86 (1883); in Mél. Biol. XI. 673 (1883).

CHILI: near Ku hei kow, *N. H. Cowdry*, no. 1291, May 13, 1921; Siwan tze near Kalgan, *Père Artselaer* (ex Maximowicz, l. c.).

SHANSI: "Shara hoda," *N. Przewalski* (ex Maximowicz, l. c.).

DISTRIBUTION: also Dahuria and Mongolia.

There is also a specimen collected by W. Purdom (no. 1145) without locality which apparently belongs here.

Prunus kansuensis Rehder in Jour. Arnold Arb. III. 21 (1922).

Amygdalus sp. F. N. Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds Pl. Imp. XLII. 50, nos. 40001 and 40004 (1918).

SHENSI: Sian fu, *F. N. Meyer*, no. 2139[a], August 30, 1914 (seeds only; plants raised from this seed cultivated in Chico, California).—See also Rehder, l. c., and Meyer, l. c.

KANSU: Kagoba, south of Hsiku, *F. N. Meyer*, no. 2141[a], October 8, 1914 (seeds only; plants raised from this seed cultivated at Chico, Calif.).—See also Rehder, l. c., and Meyer, l. c.

Prunus Persica Batsch, Beytr. Entw. Gesch. Naturr. 29 (1801), ex Junger in Bot. Zeit. XXXVI. 426.—Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 255 (Pl. David. I. 103) (1883).—Faber in Denkschr. Entwickel. Kiautschou, 32 (1898).—Bretschneider, Hist. Eur. Bot. Discov. China, 1051 (1898).—Ito in Tokyo Bot. Mag. XIV. 134 (1900).—Gilg in Bot. Jahrb. XXXIV. beibl. LXXV. 41 (1904).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 135 (1919).—Bailey, Gent. Herb. I. 28 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 113 (1922); Liste Ess. Lign. Honan, 22 (1922).

Amygdalus Persica Linnaeus, Spec. 472 (1753).—Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 96 (Enum. Pl. Chin. Bor. 22) (1833).—Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Bull. CCIV. 16 (Agric. Explor. Orch. China) (1911).

Persica vulgaris Miller, Gard. Dict. ed. 8 (1768).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 471 (Ind. Fl. Pekin.) (1859).—Debeaux in Act. Soc. Linn. Bordeaux, XXXIII. 41 (Fl. Tien-tsin, 18) (1879).

Prunus Persica β. *vulgaris* Maximowicz in Bull. Acad. Sci. St. Pétersb. XXIX. 82 (1883); in Mél. Biol. XI. 668 (1883).

CHILI: "China bor.;" ex Herb. Bunge (Gray Herb.); Hsiao Wu tai shan, *J. Hers*, no. 1574, July 16, 1921; cultivated at Peking and elsewhere (ex Bunge, l. c., Franchet, l. c., Bretschneider, l. c., Maximowicz, l. c. [1859], Debeaux, l. c., and Meyer, l. c.).

SHANTUNG: cultivated (ex Faber, l. c., Ito, l. c., Gilg, l. c., Loesener, l. c., and Meyer, l. c.).

NORTHERN KIANGSU: Hai chow hills, *Kang Fu Lai*, Hers no. 2271, October 8, 1922.

HONAN: cultivated, Cheng chow, *J. Hers*, nos. 1980, 1981, 1982, 1984, August 22, 1922.—See also Bailey, l. c., and Hers, l. c.

SHENSI: cultivated (ex Franchet, l. c., and Meyer, l. c.).

DISTRIBUTION: also cultivated in other provinces of China and often escaped and naturalized.

Though it is not known with certainty that the Peach occurs spontaneously anywhere in China, it seems highly probable that the northern provinces of China are the native country of *P. Persica* as is also the opinion of Laufer (Sino-Iranica, 539 [1919]). As is the case with other long and extensively cultivated fruit trees, it is usually impossible to make sure if plants found growing spontaneously are really native or only escaped and naturalized. Mr. Wilson found the Peach growing spontaneously in many places in central China remote from present-day settlements, but he tells me that he never felt sure that they were native as there was always the possibility that they were naturalized from old wiped out settlements.

Prunus Persica f. **duplex** (Weston) Rehder in Jour. Arnold Arb. III. 24 (1922).

Amygdalus Persica β. *multiplex* Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 96 (Enum. Pl. Chin. Bor. 22) (1833).

CHILI: cultivated at Peking (ex Bunge, l. c.).

Another double-flowered form has white flowers (*P. Persica* f. *alboplena* Schneider, Ill. Handb. Laubholzk. I. 594 [1906]); a specimen (no. 1983), though in leaf only, was sent by J. Hers from Cheng chow, Honan.

Prunus communis Arcangeli, Comp. Fl. Ital. 209 (1882).

Amygdalus communis Linnaeus, Spec. 676 (1753).—? Debeaux in Act. Soc. Linn. Bordeaux, XXXIII. 41 (Fl. Tien-tsin, 18) (1879).—? Bretschneider in Jour. N. China Branch R. As. Soc. n. ser. XV. 149 (Early Eur. Research. China) (1880).

? CHILI: cultivated (ex Debeaux, l. c.).

Debeaux is apparently mistaken when he states that the Almond is cultivated in Chili. I have seen no specimens of this species from China and none of the other botanists record it. Bretschneider (l. c.) states that Dr. Hance wrote him that he never heard of the Almond tree having been observed in China, and that the *Amygdalus communis* of Bunge is *P. Davidiana*, a statement I have been able to verify, as there is a flowering specimen of Bunge's *Amygdalus communis* in the Gray Herbarium. Also Meyer (in U. S. Dept. Agr. Bur. Pl. Indust. Bull. CCIV. 21 [1911]) says that he never saw a single true Almond tree in China and that kernels sold as almonds in Chili and Shantung are those of *P. Armeniaca*. Laufer (Sino-Iranica, 405–409) adduces sufficient evidence to show that the Almond was introduced from Persia and is not a native of China.

Prunus Davidiana Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 255 (Pl. David. I. 103) (1883).—Bretschneider, Hist. Eur. Bot. Discov. China, 860 (1898).—Koehne in Sargent, Pl. Wilson. I. 275 (1912).—Hers in Jour. N. China Branch R. As. Soc. LIII. 113 (1922); Liste Ess. Lign. Honan, 22 (1922).

Amygdalus communis Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 95 (Enum. Pl. Chin. Bor. 21) (1833).—Non Linnaeus.

Persica Davidiana Carrière in Rev. Hort. 1872, 74, fig. 10.—Bretschneider, Hist. Eur. Bot. Discov. China, 332, 860 (1898).

Prunus Persica α. *Davidiana* Maximowicz in Bull. Acad. Sci. St. Pétersb. XXIX. 81 (1883); in Mél. Biol. XI. 667 (1883).

CHILI: "Chin. bor.;" ex Herb. Bunge (Gray Herb.); Hsiao Wu tai shan, Shui shih tao, alt. 1500 m., *J. Hers*, no. 2180, October 8, 1922; Po hua shan, *J. Hers*, no. 1658, September 9, 1921; Peking, used as stock in Peking nurseries, *C. S. Sargent*, September 19, 1903; Peking, German cemetery, planted, *F. N. Meyer*, no. 1396, May 24, 1914.—See also Franchet, l. c., Bretschneider, l. c., and Maximowicz, l. c.

HONAN: Sung hsien, Shih tze miao, alt. 1200 m., *J. Hers*, no. 588, May 26, 1919; Hwei hsien, Shansi border, *J. Hers*, no. 760, June 19, 1919.—See also Hers, l. c.

SHANSI: near Hsi po po, *F. N. Meyer*, no. 1873, July 10, 1914; Nan yang shan, alt. 1500–2000 m., *J. Hers*, no. 2741, September 22–30, 1923.

SHENSI: Yenan fu, *W. Purdom*, no. 347, 1910.—See also Maximowicz, l. c., and Koehne, l. c.

KANSU: *P. J. Piasezki* (ex Maximowicz, l. c.).

DISTRIBUTION: also Kweichou, Yunnan (ex Koehne, l. c.).

Prunus Davidiana f. alba Bean in Garden, L. 165, fig. (1896).

Persica Davidiana alba Carrière in Rev. Hort. 1872, 76.

CHILI: cultivated at Peking (ex Bretschneider, Hist. Eur. Bot. Discov. China, 860 [1898]).

Prunus Davidiana var. **Potanini**, comb. nov.

Prunus Persica var. *Potanini* Batalin in Act. Hort. Petrop. XII. 164 (1892).—Bretschneider, Hist. Eur. Bot. Discov. China, 1027 (1898).—Koehne in Sargent, Pl. Wilson. I. 275 (1912).—F. N. Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Pl. Immigr. CVI. 858, no. 39899, pl. (1915).

Amygdalus Persica Potanini Ricker in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds Pl. Imp. XLII. 34, no. 39899 and p. 51, nos. 40007–40009, pl. (1918).

KANSU: near Schu tsai tze, *F. N. Meyer*, no. 1987, October 29, 1915.—See also Batalin, l. c., Koehne, l. c., Meyer, l. c., and Ricker, l. c.

Besides the specimen cited above I have seen flowering specimens from trees cultivated at Chico, California, and raised from seed sent by Meyer; these and the fruits sent by Meyer show that the plant is a variety of *P. Davidiana* and not of *P. Persica*.

Prunus tangutica Koehne in Sargent, Pl. Wilson. I. 276 (1912).

Amygdalus communis var. *tangutica* Batalin in Act. Hort. Petrop. XII. 163 (1892).

Amygdalus tangutica Korshinsky in Bull. Acad. Sci. St. Pétersb. sér. 5, XIV. 94 (1901).—F. N. Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Pl. Immigr. CVI. 854, no. 39898, pl. (1915); in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds Pl. Imp. XLII. 51, nos. 40010, 40011 (1918).

KANSU: Min chow, alt. 2600–3000 m., *W. Purdom*, no. 1029, 1910.—See also Koehne, l. c., Batalin, l. c., Korshinsky, l. c., and Meyer, l. c.

The related *P. mongolica* Maxim. discovered on the Urato Mountains, which are close to the northeastern border of Shansi, will possibly be found also in northern Chili, Shansi or Shensi.

Prunus pilosa Maximowicz in Bull. Acad. Sci. St. Pétersb. XXIX. 79 (1883); in Mél. Biol. XI. 664 (1883).

Amygdalus pilosa Turczaninov in Bull. Soc. Nat. Moscou, v. 189 (1832).—Bretschneider, Hist. Eur. Bot. Discov. China, 344 (1898).

CHILI: Tsagan Balgassu (ex Turczaninov, l. c., and Maximowicz, l. c.); Si wan tze (ex Maximowicz, l. c.).

SHANSI: "Shara hoda" Mountains (ex Maximowicz, l. c.).

Prunus triloba Lindley in Gard. Chron. 1857, 268.—Maximowicz in Bull. Soc. Nat. Moscou, LIV. 15 (1879); in Bull. Acad. Sci. St. Pétersb. XXIX. 79 (1883); in Mél. Biol. XI. 665 (1883).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 256 (Pl. David. I. 104) (1883); in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 214 (1884).—Hemsley in Jour. Linn. Soc. XXIII. 222 (1887).—Palibin in Act. Hort. Petrop. XIV. 116 (1895).—Bretschneider, Hist. Eur. Bot. Discov. China, 1052 (1898).—Koehne in Sargent, Pl. Wilson. I. 274 (1912).—Cowdry in Jour. N. China Branch R. As. Soc. LIII. 164 (Pl. Peitaiho) (1922).

Amygdalus pedunculata Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 96 (Enum. Pl. Chin. Bor.) (1833).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 471 (Ind. Fl. Pekin.) (1859).—Bretschneider, Hist. Eur. Bot. Discov. China, 332 (1898).—Non Pallas.

Of this plant there exists a double-flowered form which unfortunately is the type of the species; this makes it desirable to give varietal names to both forms, as technically the binomial should stand for the double-flowered form, while practically almost all botanists use the binomial for the spontaneous form, and without a definite varietal name it is impossible to know which form is meant.

Prunus triloba f. **multiplex,** comb. nov.

Amygdalus pedunculata β. *multiplex* Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 96 (Enum. Pl. Chin. Bor. 22) (1833).

Amygdalus pedunculata γ. *polygyna* Bunge, l. c.

Prunus triloba var. *plena* Dippel, Handb. Laubholzk. III. 608 (1893).—Koehne in Sargent, Pl. Wilson. I. 274 (1912).

CHILI: Peking, garden of German Legation, *F. N. Meyer*, no. 1393, April 19, 1914; without locality, *W. Purdom*, no. 284, 1909 (seeds only; plants raised from this seed are growing in this Arboretum).—See also Bunge, l. c., Maximowicz, l. c., and Koehne, l. c.

SHANSI: Tai pei shan, *G. Giraldi*, no. 1137, April, 1895 (ex Koehne, l. c.).

Maximowicz refers Bunge's *Amygdalus pedunculata* γ. *polygyna* to *P. Petzoldii* (=*P. triloba* var. *Petzoldii*) but the flowers I have seen of the latter plant were not polygynous, while in *f. multiplex* they are occasionally so.

Prunus triloba f. **simplex,** comb. nov.

Amygdalus pedunculata α. *simplex* Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 96 (Enum. Pl. Chin. Bor. 22) (1833).

Prunus triloba Stapf in Bot. Mag. CXXXII. t. 8061 (1906).
Prunus triloba f. *normalis* Rehder in Jour. Arnold Arb. III. 30 (1922).

CHILI: Hsiao Wu tai shan, alt. 1600–2000 m., *F. N. Meyer*, no. 1055, August, 1913; Po hua shan, *J. Hers*, nos. 1463 and 1659, July 1, 1921 and September 9, 1921 and no. 2239, October 12, 1922, and nos. 1508, 1530, and 1565, July 14 and 16, 1921; Shi wen, loess cliffs, *F. N. Meyer*, nos. 1075, 1108, August 3, 1913.—See also Bunge, l. c., Maximowicz, l. c., Franchet, l. c. (1883), Hemsley, l. c., Palibin, l. c., Koehne, l. c., and Cowdry, l. c.

SHANTUNG: (ex Franchet, l. c. [1884], Hemsley, l. c., and Koehne, l. c.).

SHANSI: Wu tai shan, alt. 1300 m., *J. Hers*, no. 2609, July 29, 1923.

KANSU: Hung li hsien, *J. Hers*, no. 2418, August 2, 1922 (sterile).

Prunus triloba var. **Petzoldii** Bailey, Stand. Cycl. Hort. v. 2831 (1916).
Prunus Petzoldii K. Koch, Dendr. I. 92 (1869).—Maximowicz in Bull. Acad. Sci. St. Pétersb. XXIX. 80 (1883); in Mél. Biol. XI. 665 (1883).—Koehne in Sargent, Pl. Wilson. I. 274 (1912).

CHILI: ex Maximowicz, l. c., and Koehne, l. c.

Prunus tomentosa Thunberg, Fl. Jap. 203 (1784).—Maximowicz in Bull. Soc. Nat. Moscou, LIV. 10 (1879); in Bull. Acad. Sci. St. Pétersb. XXIX. 95 (1883); in Mél. Biol. XI. 687 (1883).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, v. 257 (Pl. David. I. 105) (1883).—Hemsley in Jour. Linn. Soc. XXIII. 222 (1887).—Bretschneider, Hist. Eur. Bot. Discov. China, 1052 (1898).—Diels in Bot. Jahrb. XXXVI. beibl. LXXXII. 57 (1905).—Koehne in Sargent, Pl. Wilson. I. 268 (1912).—Bailey, Gent. Herb. I. 29 (1920).—Loesener in Bot. Centralbl. Beih. XXXVII. abt. II. 137 (1919).—Hers in Jour. N. China Branch R. As. Soc. LIII. 114 (1922); Liste Ess. Lign. Honan, 23 (1922).—Cowdry in Jour. N. China Branch R. As. Soc. LIII. 163 (1922).—Darrow in Jour. Hered. XV. 169, 6 figs. (1924).
Prunus triloba Hers in Jour. N. China Branch R. As. Soc. LIII. 114 (1922); Liste Ess. Lign. Honan, 23 (1922).—Non Lindley.

CHILI: Peking, *O. Warburg*, no. 6615.—See also Bunge, l. c., Maximowicz, l. c., Franchet, l. c., Hemsley, l. c., and Cowdry, l. c.

SHANTUNG: Cape Ya tau (ex Loesener, l. c.).

NORTHERN KIANGSU: Liu lin shan, near Hai chow, *J. Hers*, no. 607, May 5, 1921; Hsiao hsien, Huang tsang yu, *J. Hers*, no. 1041, May 26, 1919.

HONAN: Teng feng hsien, Yu tai shan, alt. 800 m., *J. Hers*, no. 236, April 23, 1920, no. 318, April 20, 1920; Lushih, Kiao ho, alt. 1000 m., *J. Hers*, no. 967, October 13, 1919; Yung ning, Tsi li ping, *J. Hers*, no. 425, May 22, 1919; Sung hsien, Shih tze miao, alt. 1200 m., *J. Hers*, no. 1269, September 25, 1919.—See also Hers, l. c.

SHANSI: Yuan kiu hsien, Ni shan, *J. Hers*, no. 1825, September 28, 1921; Wen yu ho valley, alt. 1200 m., *J. Hers*, no. 2762, October 2, 1923; Wu chai hsien, Ta nan kow, alt. 2000–3000 m., *Tchuang Kieh*, Hers' no. 2038, September 7, 1922.

SHENSI: Kan y san, *G. Giraldi*, June 11–12, 1897; Kin ten san, *G. Giraldi*, July 14, 1897; Lung chow, Sien fo shan, alt. 1000 m., *J. Hers*, no. 2327, July 2, 1922.—See also Diels, l. c., and Koehne, l. c.

KANSU: Min chow, *W. Purdom*, no. 1028, 1910.—See also Maximowicz, l. c., and Hemsley, l. c.

DISTRIBUTION (including varieties): also Yunnan; Himalayas, Manchuria, Korea, Japan.

In typical *P. tomentosa* the branchlets at least when young and the under side of the leaves are densely pubescent, but in Hers no. 425 from Yung ning and no. 1269 from Sung hsien, Honan, the branchlets are quite glabrous and the leaves are only slightly and sparingly villose on the midrib and the veins beneath, but in all other characters the specimens agree perfectly with *P. tomentosa* of which it apparently represents a glabrescent form. These specimens were originally identified as *P. triloba* and on the strength of it the species was credited to Honan in Hers' List of Honan ligneous plants. Also Hers' no. 318 from Yu tai shan, which is in flower, seems to belong to this glabrescent form. The species is cultivated for its fruit near Peking (see Bretschneider, l. c., and Darrow, l. c.).

Prunus tomentosa var. **endotricha** Koehne in Sargent, Pl. Wilson. I. 225 (1912).

SHENSI: several localities, *G. Giraldi* (ex Koehne, l. c.).

DISTRIBUTION: also Hupeh, Szechuan.

Prunus tomentosa var. **breviflora** Koehne in Sargent, Pl. Wilson. I. 270 (1912).

SHENSI: Quan tou shan, *G. Giraldi*, no. 5295, May 5, 1898 (ex Koehne).

Prunus tomentosa var. **trichocarpa** Koehne in Sargent, Pl. Wilson. I. 270 (1912).

Prunus trichocarpa Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 96 (Enum. Pl. Chin. Bor. 22) (1833).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 471 (Ind. Fl. Pekin.) (1859).—Bretschneider, Hist. Eur. Bot. Discov. China, 332 (1898).

CHILI: A. Bunge (ex Koehne, l. c.).

Prunus tomentosa var. **tsuluensis** Koehne in Sargent, Pl. Wilson. I. 270 (1912).

SHENSI: Tsu lu, *G. Giraldi*, no. 5295, May 4, 1897 (ex Koehne).

Koehne cites under this variety and under var. *breviflora* the same number which is apparently a mistake; localities and dates are different.

Prunus dictyoneura Diels in Bot. Jahrb. XXXVI. beibl. LXXXII. 57 (1905).—Koehne in Sargent, Pl. Wilson. I. 262 (1912).

Prunus humilis β. *villosula* Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 97 (Enum. Pl. Chin. Bor. 23) (1833).

CHILI: Peking, *O. Warburg*, no. 6607 (flowers); Ssi-jui-ssy (ex Bunge, l. c.).

HONAN: Teng feng, Yu tai shan, *J. Hers*, no. 307, June 17, 1919; Sia shi, *J. Hers*, no. 346, May 25, 1921; Mung ning, Tsi li ping, *J. Hers*, no. 476, May 22, 1919; Yu tai shan, *J. Hers*, no. 320, April 20, 1920 (flowers).

SHANSI: Yuan kiu hsien, Ni shan, *J. Hers*, no. 1818, September, 28, 1921.

SHENSI: Tai pei shan, *W. Purdom*, no. 2, 1910; Yenan fu, *W. Purdom*, no. 344, 1910 ("Flowers light pink").—See also Diels, l. c., and Koehne, l. c.

Prunus humilis Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 97 (Enum. Pl. Chin. Bor. 23) (1833).—Turczaninov in Bull. Soc. Nat. Moscou, X. no. VII. 151 (1837).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 471 (Ind. Fl. Pekin.) (1859); in Bull. Soc. Nat. Moscou, LIV. 11 (1879); in Bull. Acad. Sci. St. Pétersb. XXIX. 92 (1883); in Mél. Biol. XI. 682 (1883).—Hance in Jour. Bot. XIII. 132 (1875).—Bretschneider in Jour. N. China Branch R. As. Soc. n. ser. XV. 31 (Early Eur. Res. China) (1880); Hist. Eur. Bot. Discov. China, 20, 332, 830, 1053 (1898).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 256 (Pl. David. I. 104) (1883); in Mém. Soc. Sci. Nat. Cherbourg, XXIV. 214 (1884).—Hemsley in Jour. Linn. Soc. XXIII. 218 (1887).—Faber in Denkschr. Entwickel. Kiautschou, 32 (1898).—Gilg in Bot. Jahrb. XXXIV. beibl. LXXV. 40 (1904).—Koehne in Sargent, Pl. Wilson. I. 262 (1912); in Bot. Centralbl. Beih. XXXVII. abt. II. 136 (1919).—Limpricht, Bot. Reis. Hochgeb. Chin. Ost.-Tib. 415 (1920).—Hers in Jour. N. China Branch R. As. Soc. LIII. 113 (1922); Liste Ess. Lign. Honan, 22 (1922).—Cowdry in Jour. N. China Branch R. As. Soc. LIII. 163 (Pl. Peitaiho) (1922).

Prunus Bungei Walpers, Rep. II. 9 (1843).[1]—Debeaux in Act. Soc. Linn. Bordeaux, XXXI. 52 (Fl. Tien-tsin) (1876).

Prunus glandulosa var. *Purdomii* Koehne in Sargent, Pl. Wilson. I. 264 (1912).

CHILI: Weichang, *W. Purdom*, no. 12, 1910; San tung ying, *F. N. Meyer*, no. 951, May 28, 1913; Tung ling, in park, *N. E. Cowdry*, no. 1293, May 18, 1921; near Nan kow, *F. N. Meyer*, no. 1039, July 28, 1913; Peking, *C. A. Skatchkov* (Gray Herb.); Ming Tombs, near Peking, *J. G. Jack*, October 6, 1905; western hills, Peking, *J. Hers*, no. 1586, August 7, 1921; near Hsiao Wu tai shan, *F. N. Meyer*, no. 1103, August 4, 1913; Hsiao Wu tai shan, *J. Hers*, no. 1527, July 14, 1921.—See also Bunge, l. c., Maximowicz, l. c., Hance, l. c., Bretschneider, l. c., Franchet, l. c. (1883), Hemsley, l. c., Koehne, l. c. (1912), Limpricht, l. c., and Cowdry, l. c.

SHANTUNG: Chifu (ex Maximowicz, l. c. [1883], Hemsley, l. c., and Debeaux, l. c.); Tsing tau (ex Faber, l. c., Gilg, l. c., and Koehne, l. c. [1919]).

HONAN: (ex Hers, l. c.).

I am unable to separate from *P. humilis*, which agrees in the shape and in the conspicuous reticulation of the leaves, Koehne's *P. glandulosa* var. *Purdomii* of which I have before me besides Purdom's flowering specimen, specimens with flowers and leaves from a cultivated plant determined by Koehne himself as var. *Purdomii*.

From Shantung and from Honan I have seen no specimens and it is possible that these references belong to *P. glandulosa* to which I refer the only specimen of this group I have seen from Shantung.

[1] Walpers changed Bunge's name to *P. Bungei* on account of *Cerasus humilis* Morison of 1827, but the combination under Prunus was not made until 1834 by Colla, one year after the publication of *Prunus humilis* Bunge.

Prunus glandulosa Thunberg, Fl. Jap. 202 (1784).—Koehne in Bot. Centralbl. Beih. XXXVII. abt. II. 136 (1919).—Bailey, Gent. Herb. I. 28 (1920).

Prunus japonica var. *glandulosa* Ito in Tokyo Bot. Mag. XIV. 136 (1900).
Prunus japonica β. *P. glandulosa* Maximowicz in Bull. Soc. Nat. Moscou, LIV. 13 (1879).

SHANTUNG: Chifu, low shrub on hills, *N. H. Cowdry*, no. 2163, July 3, 1920; "Kleines Perlgebirge (Hsiautshushan)" ex Koehne.

HONAN: cultivated plant introduced from the Sung shan, *J. Hers*, no. 198, April 20, 1921; Chi kung shan (ex Bailey, l. c.).

DISTRIBUTION: also Chekiang, Hupeh; Manchuria, Japan.

Prunus glandulosa var. **trichostyla** f. **sinensis** Koehne in Sargent, Pl. Wilson. I. 265 (1912).

Prunus japonica var. γ. Maximowicz in Bull. Soc. Nat. Moscou, LIV. 14 (1879), pro parte; in Bull. Acad. Sci. St. Pétersb. XXIX. 95 (1883); in Mél. Biol. XI. 686 (1883).
Prunus japonica Pritzel in Bot. Jahrb. XXIX. 407 (1900), quoad plantam e Shensi.—Non Thunberg.

SHENSI: cultivated (ex Koehne, l. c., Maximowicz, l. c., and Pritzel, l. c.).

DISTRIBUTION: cultivated in other provinces of China and in Japan.

Prunus glandulosa var. **trichostyla** f. **Faberi** Koehne in Sargent, Pl. Wilson. I. 224 (1912).

SHANTUNG: Tien tai and Chifu Mountains, *E. Faber* (ex Koehne, l. c.).

DISTRIBUTION: also Hupeh.

Prunus japonica Thunberg, Fl. Jap. 201 (1784).—Gilg in Bot. Jahrb. XXXIV. beibl. LXXV. 41 (1904).—Koehne in Bot. Centralbl. Beih. XXXVII. abt. II. 136 (1919).

Prunus japonica var. *typica* Ito in Tokyo Bot. Mag. XIV. 135 (1900).

SHANTUNG: Lau shan and Cape Ya tau (ex Gilg, l. c., and Koehne, l. c.); island Liu kung, cultivated (ex Ito, l. c.).

DISTRIBUTION (including the varieties): also Kiangsu, Chekiang, Fokien; Manchuria, Korea, Japan.

Prunus stipulacea Maximowicz in Bull. Acad. Sci. St. Pétersb. XXIX. 97 (1883); in Mél. Biol. XI. 689 (1883).—Bretschneider, Hist. Eur. Bot. Discov. China, 975 (1898).—Koehne in Sargent, Pl. Wilson. I. 258 (1912).

KANSU: Tangut Region, *N. Przewalski* (ex Maximowicz, l. c., and Koehne, l. c.).

Prunus Giraldiana Schneider in Fedde, Rep. Nov. Spec. I. 65 (1905).—Koehne in Sargent, Pl. Wilson. I. 257 (1912).

SHENSI: Quen tou shan, *G. Giraldi*, no. 3789 (ex Schneider, l. c., and Koehne, l. c.).

Prunus phyllopoda Koehne in Sargent, Pl. Wilson. I. 257 (1912).

? *Prunus aff. pauciflora* Diels in Bot. Jahrb. XXXVI. beibl. LXXXII. 57 (1905).

SHENSI: Ken y shan, *G. Giraldi* (ex Koehne, l. c., and Diels, l. c.).

Prunus setulosa Batalin in Act. Hort. Petrop. XII. 165 (1892); in Gartenfl. XLII. 330 (1892).—Bretschneider, Hist. Eur. Bot. Discov. China, 1027 (1898).—Koehne in Sargent, Pl. Wilson. I. 257 (1912).

KANSU: Minchow, alt. 2600 m., *W. Purdom*, no. 1030, 1910.—See also Batalin, l. c., and Koehne, l. c.

Prunus pseudocerasus Lindley in Trans. Hort. Soc. Lond. VI. 90 (1826).—Bretschneider, Hist. Eur. Bot. Discov. China, 1052 (1898).—Koehne in Fedde, Rep. Spec. Nov. XI. 270 (1912).—Hers in Jour. N. China Branch R. As. Soc. LIII. 113 (1922); Liste Ess. Lign. Honan, 22 (1922).

Prunus pauciflora Bunge in Mém. Div. Sav. Acad. Sci. St. Pétersb. II. 97 (Enum. Pl. Chin. Bor. 23) (1833).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 471 (Ind. Fl. Pekin.) (1859); in Bull. Acad. Sci. St. Pétersb. XXIX. 100 (1883); in Mél. Biol. XI. 694 (1883).—Hemsley in Jour. Linn. Soc. XXIII. 220 (1887).—Bretschneider, Hist. Eur. Bot. Discov. China, 332, 1052 (1898).—Ito in Tokyo Bot. Mag. XIV. 136 (1900).—Koehne in Sargent, Pl. Wilson. I. 252 (1912); in Bot. Centralbl. Beih. XXXVII. abt. II. 136 (1919).

? *Cerasus* spec. Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 471 (Ind. Fl. Pekin.) (1859).

Prunus Cerasus Debeaux in Act. Soc. Linn. Bordeaux, XXXIII. 42 (Fl. Tientsin, 19) (1897).—Faber in Denkschr. Entwickel. Kiautschou, 32 (1898).—Ito in Tokyo Bot. Mag. XIV. 136 (1900).—Gilg in Bot. Jahrb. XXXIV. beibl. LXXV. 41 (1904).—Non Linnaeus.

Prunus pendula Gilg in Bot. Jahrb. XXXIV. beibl. LXXV. 41 (1904).—Non Maximowicz.

CHILI: Ying tou ko, *F. N. Meyer*, no. 1171, September 12, 1912.—See also Bretschneider, l. c., Bunge, l. c., Maximowicz, l. c., Hemsley, l. c., Koehne, in Sargent, l. c. (1912), and Debeaux, l. c.

SHANTUNG: near Chifu (ex Ito, l. c.); near Tsingtau (ex Koehne, l. c. [1919]), Faber, l. c., and Gilg, l. c.

NORTHERN KIANGSU: Liu lin shan, near Hai chow, *J. Hers*, no. 665, May 5, 1920.

HONAN: Cheng chow, cultivated on the Honan plain, *J. Hers*, no. 86, April 20, 1920; Sung hsien, Shih tze miao, *J. Hers*, nos. 107, 148, October 3, 1919 and no. 1282, September 25, 1919; Sung hsien, San kuan miao, alt. 1200 m., *J. Hers*, no. 502, May 24, 1919; Huang ho region, *J. Hers*, no. 1125, October, 1919.—See also Hers, l. c.

DISTRIBUTION: cultivated also in Hupeh and in other provinces of China and in Japan.

This is the only species of the true Cherries cultivated in China for its fruit. It is probably native on the mountains of Chili and Honan and elsewhere it occurs only as a cultivated tree. Meyer's no. 1171 differs from the other specimens in the leaves being pilose on the veins beneath and short-pilose above when young, but the greater development of pubescence may be due to the fact that the specimen consists of a vigorous shoot.

Prunus Sieboldii Wittmack in Gartenfl. LI. 272 (1902).

Prunus Pseudo-Cerasus var. *Sieboldii* Maximowicz in Bull. Acad. Sci. St. Pétersb. XXIX. 102 (1883); in Mél. Biol. XI. 697 (1883).—Ito in Tokyo Bot. Mag. XIV. 137 (1900).

SHANTUNG: cultivated (ex Ito, l. c.).

DISTRIBUTION: also cultivated in Japan.

Prunus serrulata var. **pubescens** Wilson, Cherries Japan, 31 (1916).—Hers in Jour. N. China Branch R. As. Soc. LIII. 133 (1922); Liste Ess. Lign. Honan, 23 (1922).

Prunus tenuiflora of *Nebelii* Koehne in Bot. Centralbl. XXXVII. abt. II. 136, t. 6[B] (1919).

SHANTUNG: Laushan, *O. Nebel* (ex Koehne, l. c.).

NORTHERN KIANGSU: Liu lin shan, near Hai chow, *J. Hers*, no. 666, May 5, 1921; Hai chow hills, alt. about 200 m., *Kang Fu Lai*, Hers nos. 2307, 2317, October 8, 1922.

HONAN: (ex Hers, l. c.).

SHENSI: Lung chow, Li kia po, alt. 1400 m., *J. Hers*, no. 2383, July 4, 1922.

DISTRIBUTION: also Hupeh; Korea, Japan.

Prunus pilosiuscula Koehne in Sargent, Pl. Wilson. I. 202 (1912).

HONAN: Tsi yuan hsien, Tien tan shan, *J. Hers*, nos. 1775, 1793, 1813 and 1891, September 21, 1921; Fu niu shan, *J. Hers*, no. 141, October 6, 1918; Sung hsien, Shih tze miao, alt. 1200 m., *J. Hers*, nos. 1242 and 1256, September 25, 1919; Yung ning, Tsi li ping, alt. 1000 m., *J. Hers*, no. 1349, September 30, 1919; Lu shih, Tang ho, alt. 1000 m., *J. Hers*, no. 949, October 11, 1919.

The specimens cited above, though they are all sterile, agree well in the characters of the leaves, stipules and branchlets with *P. pilosiuscula*, so that I do not hesitate to refer them to that species even without flowers. They apparently belong to the form distinguished as var. *barbata* Koehne (l. c.) which differs from typical *P. pilosiuscula* named var. *media* by Koehne in the leaves of the flowering branches, being glabrous beneath except axillary tufts of hairs. On vigorous shoots, however, the leaves are often densely pubescent beneath and oblong-ovate with gradually acuminate apex, quite different in shape from the generally obovate abruptly acuminate leaves of the flowering branches, but plants of this species cultivated at this Arboretum show that this is the usual form of vigorous shoots; the tendency toward pubescence on the under side of the leaves is noticeable even in some of the co-types of var. *barbata* which have the upper leaves of the elongated branchlets more or less pubescent beneath.

Prunus Padus Linnaeus, Spec. 473 (1753).—Maximowicz in Mém. Div. Sav. Acad. Sci. St. Pétersb. IX. 471 (Ind. Fl. Pekin.) (1859); in Bull. Acad. Sci. St. Pétersb. XXIX. 108 (1883); in Mél. Biol. XI. 705 (1883).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, V. 258 (Pl. David. I. 106) (1883).—Hemsley in Jour. Linn. Soc. XXIII. 220 (1887).—Diels in Bot. Jahrb. XXXVI. beibl. LXXXII. 57 (1905).—Koehne in Sargent, Pl. Wilson. I. 72 (1911).

CHILI: Weichang, *W. Purdom*, no. 14, May 24, 1909; Hsiao Wu tai shan, *F. N. Meyer*, no. 1170, August 12, 1913 (Gray Herb.); *J. Hers*, nos. 1513 and 1551, July 14, 1921.—See also Maximowicz, l. c., Franchet, l. c., Hemsley, l. c., and Koehne, l. c.

SHENSI: Huan tou shan, *G. Giraldi*, no. 7167 (ex Diels, l. c.).

DISTRIBUTION: also Mongolia, Siberia and Europe.

Prunus Padus var. **pubescens** Regel & Tiling in Nouv. Mém. Soc. Nat. Moscou, XI. 79 (Fl. Ajan.) (1858).—Maximowicz in Bull. Acad. Sci. St. Pétersb. XXIX. 108 (1883); in Mél. Biol. XI. 706 (1883).

CHILI: Po hua shan, *J. Hers*, nos. 1401 and 1420, May 1, 1921.—See also Maximowicz, l. c.

SHANSI: Wu chai hsien, Ta nan kow, alt. 2000–3000 m., *Tchuang Kieh*, Hers nos. 2029 and 2034, September 7, 1922.

KANSU: Min chow, alt. 2600 m., *W. Purdom*, no. 1031, 1910.

DISTRIBUTION: also Mongolia, Manchuria, Siberia.

Prunus Padus var. **pubescens** f. **Purdomii** Koehne in Sargent, Pl. Wilson. I. 196 (1912).

CHILI: Wei chang, *W. Purdom*, no. 15 (in part), May 26, 1909; Hsiao Wu tai shan, alt. 2600 m., *F. N. Meyer*, no. 1170, August 12, 1913.

SHANSI: Fang shan hsien, Nan yang shan, alt. 1500–2500 m., *J. Hers*, nos. 2705 and 2712, September 22–30, 1923.

On the label of No. 2712 there is a note stating that the tree is used for making baskets.

Prunus brachypoda Batalin in Act. Hort. Petrop. XII. 166 (1892); in Gartenfl. XLII. 330 (1893).—Bretschneider, Hist. Eur. Bot. Discov. China, 1027 (1898).

KANSU: between Morping and Wuping, *G. N. Potanin* (ex Batalin, l. c.).

Prunus brachypoda var. **pseudossiori** Koehne in Sargent, Pl. Wilson. I. 65 (1911).

Prunus ssiori Pritzel in Bot. Jahrb. XXIX. 408 (1900).—Non Fr. Schmidt.

HONAN: Lushih, Hiung eul shan, alt. 1300 m., *J. Hers*, no. 864, October 9, 1919; Lushih, Tang ho, alt. 1000 m., *J. Hers*, no. 953, October 11, 1919; Lushih, Kiao ho, alt. 1000 m., *J. Hers*, no. 962, October 12, 1919; Lushih, Tung ho, alt. 1000 m., *J. Hers*, no. 989, October 14, 1919; Sung hsien, San kuan miao, alt. 1000 m., *J. Hers*, no. 1306, September 27, 1919; Yung ning, Tsi li ping, alt. 1000 m., *J. Hers*, no. 1376, September 30, 1919; Tsi yuan hsien, Tien tan shan, *J. Hers*, no. 1809, September 21, 1921.

SHENSI: Tai pei shan, *W. Purdom*, no. 1, 1910; Lung chow, Sien fo shan, alt. 1000 m., *J. Hers*, no. 2326, July 2, 1922.—See also Koehne, l. c., and Pritzel, l. c.

DISTRIBUTION: also Hupeh and Szechuan.

As all the specimens cited above are sterile, their identification is open to doubt; some specimens such as nos. 864, 962 and 1376 differ from typical

var. *pseudossiori* in their broader and shorter, elliptic to obovate, abruptly acuminate leaves but agree in serration and texture with specimens of typical leaf shape; no. 1809 has rather membranous leaves and may possibly belong to *P. Padus*.

Prunus sericea Koehne var. **septentrionalis** Koehne in Sargent, Pl. Wilson. I. 64 (1911).

Prunus nepalensis var. *sericea* Diels in Bot. Jahrb. XXXVI. beibl. LXXXII. 57 (1905).—Vix Batalin.

SHENSI: In kia po, *G. Giraldi*, no. 6081 (ex Koehne, l. c., and Diels, l. c.).

Prunus velutina Batalin in Act. Hort. Petrop. XIV. 186 (1895).—Koehne in Sargent, Pl. Wilson. I. 69 (1911).

SHENSI: *G. Giraldi*, no. 4931 (ex Koehne, l. c.).

DISTRIBUTION: also Hupeh.

The following three apparently distinct forms of Prunus of the Hers collection have remained unidentified owing to the incomplete material:

Prunus spec. from Honan: Sung hsien, San kuan miao, *J. Hers*, no. 548, May 24, 1919 (with young fruits). Apparently related to *P. triloba*, but the bark of one-year-old branches is light yellow and exfoliates in flakes and strips.

Prunus spec. from Shensi: Lung chow, Kuan shan, alt. 2000 m., *J. Hers*, no. 2358, July 3, 1922 (sterile). Related to *P. lobulata* Koehne, but the leaves are rather short-petioled and the stipules more leaf-like and less deeply divided.

Prunus spec. from Honan: Sung hsien, Shih tze miao, *J. Hers*, nos. 484 and 1273, May 26 and September 25, 1919 (sterile). Similar to *P. Padus* var. *pubescens*, but the leaves are larger, finely serrulate and glaucous beneath.

Prinsepia uniflora Batalin in Act. Hort. Petrop. XII. 167 (1892); in Gartenfl. XLII. 331 (1892).—Rehder in Sargent, Pl. Wilson. I. 345 (1915).—Farrer in Jour. Roy. Hort. Soc. XLII. 103 (1916).—F. N. Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds Pl. Imp. XLI. 28, no. 39432, pl. 3, 4 (1917); XLII. 53, no. 40023 (1918).—Hers in Jour. N. China Branch R. As. Soc. LIII. 115 (1922); Liste Ess. Lign. Honan, 26 (1922).

HONAN: Mien chih, alt. 800 m., *J. Hers*, no. 68, August 20, 1919; Kung hsien, *J. Hers*, no. 89, April 22, 1920 and no. 197, April 18, 1921; Hsiao hsien, Huang tsang yu, alt. 200 m., *J. Hers*, no. 1034, May 26, 1919.—See also Hers, l. c.

SHANSI: Fu cheng, *F. N. Meyer*, no. 1633, July 21, 1915; Fen chow, *J. Hers*, no. 1907, April 20, 1922.—See also Meyer, l. c. (1917).

SHENSI: Yenan fu, *W. Purdom*, no. 324, 1910.

KANSU: San sze miau, *F. N. Meyer*, no. 2161[a], December 1, 1914 (seeds only; plants raised at Chico, California).—See also Farrer, l. c., and Meyer, l. c. (1918).

(*To be continued*)

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NOTES ON THE GENUS PINUS

GEORGE RUSSELL SHAW

THE OBLIQUE CONE

To the characters that authors employ for circumscribing Pinus, should be added the tendency of the genus to produce oblique cones. This form of cone is usually described as asymmetrical, but it is not absolutely without symmetry, for it may be divided into two like parts by a plane passing through the axes of both the cone and its branch, while the cones of Picea and other allied genera are symmetrical with reference to any plane that includes the cone-axis.

In Pinus the cones grow from the nodes only of the branch and, when the branchlet bears more than one cone, they are disposed in verticillate groups. The reflexed oblique cone fits perfectly into the verticillate arrangement, the thickness and the size of the scales varying with the difference of exposure. This peculiar elaboration, in its perfection, appears among the serotinous Pines whose cones persist on the tree and retain their seeds intact for many years.

In its least development the oblique form may be seen in the curved cones, or in the eccentric insertion of the cone-peduncle, of many species of both sections. It is the result of a lesser or greater inequality in the growth of the anterior and posterior tissues. In some degree it is present in all, or nearly all of the Pines and various degrees of obliquity are associated in the same species. It is sufficiently prevalent to be accepted as a characteristic peculiarity of the genus.

SECTIONAL CHARACTERS

The characters determining the two sections of Pinus are many but they are not all absolutely invariable.

Haploxylon

Fibro-vascular bundle of the leaves single.
Sheath of the leaf-fascicle deciduous.
Bracts subtending the leaf-fascicles not decurrent on the branchlet.
Staminate flowers not sufficiently developed in the winter-bud to be apparent.
Connective of the pollen-sacs relatively small.

Cones of lower phyllotaxis.
Ray-tracheids with smooth walls.
Bark-formation late.

Diploxylon

Fibro-vascular bundles of the leaves double.
Sheath of the leaf-fascicle persistent.
Bracts subtending the leaf-fascicles decurrent on the branchlet.
Staminate flowers sufficiently developed in the winter-bud to be recognized.
Connective of the pollen-sacs relatively large.
Cones of higher phyllotaxis.
Ray-tracheids with dentate walls.
Bark-formation early.

Several of these characters are subject to a few exceptions such as, for instance, the persistent sheath of the Soft Pine, *P. Nelsonii* Shaw or the deciduous sheath of the Hard Pine, *P. leiophylla*, the large connective of *P. excelsa* Wall. or the small connective of *P. sylvestris* L., the late bark-formation of *P. halepensis* Mill., *P. pseudostrobus* Lindl., etc., etc. Nevertheless there is no difficulty in placing a species in its proper section, for, in every case, the determinative characters so predominate that the recognition of a Soft, or a Hard Pine is immediate.

SUBSECTIONS AND GROUPS

In the section Haploxylon the subsections are determined by the peculiarities of the cones while the groups follow the construction of the seeds (Shaw, Gen. Pinus, 25, [1914]). In Flexiles, however, the seed is not sufficiently distinct to justify the retention of this group. The seed-wing, though very short, is nevertheless obvious and, like the wing of the Strobi, is adnate to the nut. The seed-wings of the subsection Strobi vary much in length and, in the *P. ayacahuite* Ehrenb., the wing of the northern variety is almost rudimentary and so like that of *P. flexilis* James that the demarcation between Flexiles and Strobi is not clearly defined. With this change the subsections and groups should be tabulated as follows:

A—HAPLOXYLON.

a—CEMBRA.
Scales of the conelet unarmed, umbo of the cone-scales terminal, pits of the ray-cells large.
I—Cembrae.
Cones indehiscent.
Seeds wingless.
II—Strobi.
Cones dehiscent.
Seeds with an adnate wing.

b—PARACEMBRA.
Scales of the conelet armed, umbo of the cone-scales dorsal, pits of the ray-cells small.
III—Cembroides.
Seeds wingless.

IV—Gerardianae.
Seeds with a short deciduous wing.
V—Balfourianae.
Seeds with a long effective wing.

B—DIPLOXYLON.
c—PARAPINASTER.
Fascicle-sheath or seed-wing of Haploxylon.
VI—Leiophyllae.
Fascicle-sheath deciduous.
VII—Longifoliae.
Seed-wing of the Strobi.
VIII—Pineae.
Seed-wing of the Gerardianae.
d—PINASTER.
Fascicle-sheath persistent, seed-wing articulate.
IX—Lariciones.
Seed-wing membranous throughout.
Cones opening at maturity.
Pits of the ray-cells large.
X—Australes.
Seed-wing membranous throughout.
Cones opening at maturity.
Pits of the ray-cells small.
XI—Insignes.
Seed-wing membranous or slightly thickened.
Cones serotinous.
Pits of the ray-cells small.
XII—Macrocarpae.
Seed-wing very thick at base.

PINUS KREMPFII

1921—P. KREMPFII H. Lecomte in Bull. Mus. Hist. Nat., 191, figs.

The leaves of this new species from Annam contain single fibro-vascular bundles and the fascicle-sheath is deciduous. Lecomte's species is, therefore, a Soft Pine (Haploxylon). The dorsal umbo of the cone-scales places it in the subsection Paracembra while the long and effective seed-wing associates it with the group Balfourianae.

NOTES ON CHINESE LIGNEOUS PLANTS

H. H. HU

While working on a manual called 'Synopsis of Chinese Genera of Phaenogams with Descriptions of Representative Species' I find it necessary to make a number of new combinations of species to be mentioned therein. In this Synopsis I am not following the International Rules of Botanical Nomenclature in retaining the Nomina Conservanda, but am using the oldest generic names since the publication of Linnaeus' Species Plantarum in 1753. As the Arnold Arboretum in its publications follows the International Rules, only those combinations which are in accordance

with these rules are given here. Neither did I attempt to make here the necessary combinations of all Chinese species, but only of those species which are included in my book, nor are the new combinations of herbaceous plants given, since the Journal of the Arnold Arboretum is devoted only to woody plants. A few supplementary descriptions are published, based on more complete material in the herbarium of this Arboretum, and a few new species are proposed and described which I discovered while studying the herbarium material of this Arboretum in connection with my work.

Vanieria tricuspidata, comb. nov.

Maclura tricuspidata Carrière in Rev. Hort. (1864), 390.
Cudranus trilobus Hance in Journ. Bot. VI. 49 (1868).
Cudrania tricuspidata Bureau in Lavallée, Arb. Segrez. 243 (1876).

E. D. Merrill identified Loureiro's obscure species *Vanieria cochinchinensis* with *Cudrania javanensis* in his Commentary on Loureiro's Flora Cochinchinensis, and T. Nakai independently reached the same conclusion when he recently studied in the Arnold Arboretum. As Cudrania is not a nomen conservandum and Vanieria is an earlier name, it should be adopted, hence the new combination.

Polychroa scabra, comb. nov.

Pellionia scabra Bentham, Fl. Hongk. 330 (1861).

Polychroa is another of Loureiro's genera which E. D. Merrill succeeded to identify with a more recent and generally accepted genus, in this case Pellionia Gaudichaud. Following him I propose this new combination.

Magnolia Fordiana, comb. nov.

Manglietia Fordiana Oliver in Hooker's Icon. XX. t. 1953 (1881).

Manglietia differs from Magnolia in having six or more ovules in each carpel instead of two. I quite agree with Prantl (in Engler & Prantl, Nat. Pflanzenfam. III. abt. I. 16 [1888]) in considering the difference not of generic importance and consequently in the reduction of Manglietia to Magnolia.

Spatholobus parviflorus, comb. nov.

Butea parviflora Roxburgh, Hort. Bengal. 53 (1814); Fl. Ind. III. 248 (1832).
Spatholobus Roxburghii Bentham in Pl. Jungh. 238 (1851–55).

Aspidopteris orbiculata, comb. nov.

Hiraea orbiculata Roxburgh, Hort. Bengal. 90 (1814), nomen; Wallich, Pl. As. Rar. I. 13 (1830).
Hiraea nutans Roxburgh, Fl. Ind. II. 447 (1832).
Hiraea rotundifolia Roxburgh, l. c. 448.
Aspidopteris nutans Hooker f., Fl. Brit. Ind. I. 421 (1875).—Non A. Juss.

Fagara mengtzeana, nom. nov.

Zanthoxylum multifoliolatum Hemsley in Hooker's Icon. XXVI. t. 2595 (1899).

This species is referable to Fagara, and as there is already a *Fagara multifoliolata* Engler which is a native of Pondoland, Africa, a new name is proposed here.

Walsura trijuga Kurz var. **microcarpa,** comb. nov.

Heynea trijuga Roxburgh var. *microcarpa* Pierre, Fl. Forest. Cochinch. v. in textu ad t. 355 (1899).

Harms (in Engler & Prantl, Nat. Pflanzenfam. III. abt. IV. 303 [1896]) reduced Heynea Roxburgh to a section of Walsura Roxburgh and in following him a new combination of Pierre's varietal name becomes necessary.

Tapirira hirsuta, comb. nov.

Robergia hirsuta Roxburgh, Fl. Ind. II. 455 (1832).

Tapiria hirsuta Hooker f., Fl. Brit. Ind. II. 28 (1879).

Tapirira Aublet was published in 1775, while Tapiria Jussieu was not published until 1789, thus the former generic name should be adopted. As Hooker f. used Jussieu's Tapiria, we cannot ascribe the correct combination to him, although the difference between these two names is slight, therefore the combination under Tapirira should be considered as new.

Stemonurus hainanensis, comb. nov.

Gomphandra hainanensis Merrill in Philip. Journ. Sci. XXI. 348 (1922).

Stemonurus Blume was published in 1825, Gomphandra Wallich in 1832, therefore the former generic name should be adopted and a new combination made for this species.

Elaeocarpus kwangtungensis, sp. nov.

Ramuli foliorum basibus asperata. Folia obovata, 4–9 cm. longa et 2–3.5 cm. lata, obtusa vel obtuse cuspidata, obtuse et adpresse serrata, basin versus angustata et in petiolum planum subalatum 5–12 mm. longum decurrentia, supra glabra, subtus pilis fasciculatis verrucas elevatas insidentibus instructa. Pedunculi et pedicelli satis validi; pedicelli 6 mm. longi. Fructus ellipsoideo-oblongus, satis siccus, laevis, 12–14 mm. longus et 7 mm. diam.

Affinis *E. chinensi* Hooker f., sed differt foliis obovatis non acuminatis, basi in petiolum latum non canaliculatum decurrentibus et subtus pilis fasciculatis in verruculis leviter elevatis instructis.

KWANGTUNG: vicinity of Canton City, *C. O. Levine,* Canton Christian College Herbarium, no. 1623, September 24, 1917 (type). This specimen was identified by E. D. Merrill as *E. chinensis* Hooker f. from which it differs in several important points, as stated above.

Elaeocarpus yentangensis, sp. nov.

Arbor 4.5 m. alta. Folia sparsa, lanceolata vel oblanceolata ad elliptico-obovata, 7–9 cm. longa et 3–4 cm. lata, breviter et obtuse acuminata, basi cuneata vel rotundata, ut videtur articulata, remote vel dense adpresse serrata, supra glabra et lucide viridia, subtus obscure et pallide viridia, satis manifeste reticulata; petioli 1.5–3 cm. longi. Fructus late ellipsoideus, 12 mm. longus et 9 mm. diam., pallide coeruleus, carnosus, rugosus in sicco.

Affinis *E. glabripetalo* Merrill, sed fructus major et crassior.

CHEKIANG: South Yeng-tang Shan, Ping-yang district, *H. H. Hu*, no. 237 (type), August 24, 1920.

Sloanea sinensis, comb. nov.

Echinocarpus sinensis Hance in Jour. Bot. XXII. 108 (1884).

Tree about 10 m. high, with spreading and pithy branches. Leaves oblanceolate, acuminate, obtusely or acutely cuneate at base, entire or remotely dentate above the middle, veins and reticulations not very prominent, glabrous above, puberulous beneath especially along the veins, 10 cm. long, 4 cm. broad; petiole 1–3 cm. long. Flowers greenish-white, about 1.5 cm. in diameter; peduncle 6–8 cm. long, gray-pubescent. Sepals oblong, about 6 mm. long, 4 mm. broad, gray-pubescent. Petals broader than long, deeply lobed, gray-pubescent. Stamens numerous, crowded; anthers apiculate, with straw-colored sericeous pubescence. Ovary conical, gray-pubescent. Fruit with 5–6 stellately spread woody valves colored purple inside; setae rigid, slender, filiform, covered with straw-colored pubescence. Seeds with a yellowish arillus, solitary in each cell.

KWANGTUNG: Lo-fau shan, *E. Faber*, September, 1883 (Herb. Hance, no. 22216).

CHEKIANG: Swen-chi, southern Yeng-tang shan, Ping yang district, *H. H. Hu*, no. 95, August 26, 1920.

This species was confused with *Sloanea Hemsleyana* Rehd. & Wils., from which it differs in its smaller flowers and generally paler pubescence of flower and fruit. As the original description was based only on a fruiting specimen, a more complete description including that of the flowers is given here.

Eriolaena szemaoensis, sp. nov.

Arbor 5–10 m. alta; ramuli graciles, plus minusve stellato-tomentosi, mox glabrescentes. Folia orbiculari-ovata, 6–11 cm. longa et 7.5–10 cm. lata, apice obtusa vel obtuse acuteve acuminata, basi late cordata, toto margine crenato-dentata, supra stellato-tomentosa, subtus dense fulvide stellato-tomentosa; petioli plus minusve stellato-tomentosi, 2–3.5 cm. longi. Flores 3.5 cm. diam., in paniculis multifloris; bracteolae paullo infra flores, lineari-lanceolata, circiter 4 mm. longa, acuta, integra, reflexa, cinereo-tomentosa; alabastra oblonga, acuta, medio leviter constricta; calyx initio spathaceus, demum 5-partita; sepala lineari-lanceolata, extus fulvide stellato-tomentosa, intus colorata et sparse adpresse tomentosa, 2.5 cm. longa et 3.5 mm. lata; petala obovato-spathulata, ut videtur lutescentia, sepalis aequilonga, circiter 5 mm. lata, unguiculo villoso; tubus staminalis 18 mm. longus; antherae 3 mm. longae; stylus villosus, apice clavatus et glandulosus, stigmatis lobis 8 brevibus erectis. Capsula pedunculo incrassato et valido insidens, conico-ovoidea, 3.5–5 cm. longa et 2–2.5 cm. diam., apiculata, dense fulvide stellato-tomentosa, 8-valvata, valvis acutis in costis tuberculatis demum glabrescentibus, intus villosis;

semina 8 in quoque loculo, biseriata, adscendentia et imbricata, alis ad 12 mm. longis exclusis 4–5 mm. longa.

Affinis *E. spectabili* Planch., sed differt floribus minoribus, valvis capsulae acutis, foliis crenato-dentatis et subtus dense fulvide stellato-tomentosis.

YUNNAN: Szemao, *A. Henry*, nos. 11873 (type), 12506, 12506 A and 12506 B.

Eriolaena glabrescens, sp. nov.

Frutex 3 m. altus; ramuli plus minusve stellato-pubescentes. Folia orbiculari-ovata, 7–11 cm. longa et 6.5–10 cm. lata, acuta vel breviter acuminata, basi truncata vel late cordata, crenato-serrata, supra sparse, ad venas subtus densius stellato-pubescentia, demum utrinque glabrescentia, petioli 2–3 cm. longi; inflorescentia corymbosa, multiflora, rufo-stellato-tomentosa; bracteolae spathulato-ligulatae, profunde pinnatifidae, circiter 1.5 cm. longae, rufo-stellato-tomentosae; alabastra conico-oblonga, apiculata, flavido-alba; filamenta tubi staminalis et antherae breviora quam in specie precedente; stylus villosus, lobis stigmatis 8 recurvis. Fructus ignotus.

Affinis *E. Candollei* Wall., sed differt foliis utrinque glabrescentibus venis rufis stellato-pubescentibus exceptis, juvenilibus etiam stellato-pubescentibus tantum in venis et venulis.

YUNNAN: Szemao, southern mountains, *A. Henry*, no. 12343 (type).

Pterospermum Levinei Merrill in Philipp. Jour. Sci. XIII. 125 (1918).

Tree about 13 m. high; the young parts densely rusty to whitish tomentose; branches terete, glabrous, slender. Leaves oblong to obcuneate, acuminate to short-cuspidate, subcoriaceous, entire, base slightly inequilateral and truncate to obcordate, brownish-olive, shining and glabrous above, densely tomentose beneath, 8–14 cm. long and 4–5.5 cm. broad; petiole about 8 mm. long; stipules ovate to oblong-ovate, entire, inequilateral, acute to acuminate, minutely white-tomentose on both surfaces, about 5 mm. long, deciduous. Flowers axillary, solitary or 2–3 together; peduncle stoutish, 5–10 mm. long, densely tomentose, bracteoles 2, laciniate, lobes subulate, tomentose, persistent; pedicels about 5 mm. long; calyx deeply divided, to 2.5 cm. long, segments narrow spathulate, obtusish, tomentose outside, appressed sericeous-villose inside, 2 cm. long, 3 mm. broad; petals red, spatulate, as long as the calyx-segments and slightly broader; stamens ⅔ as long as the rough and stellate-pilose rudimentary stamens, 1 cm. long; anthers linear, 5 mm. long; ovary ovoid, densely hirtellate. Fruit ellipsoid to oblong-ellipsoid, terete, apex minutely and shortly acuminate, base stipitate, densely and minutely rusty stellate-tomentose, 4.5–5 cm. long; stipe about 8 mm. long; seeds with wings about 2.5 cm. long, 6–7 mm. broad.

KWANGTUNG, HAINAN.

In the herbarium of the Arnold Arboretum there is a flowering specimen

of Pterospermum collected by Faber at Hainan without number, which was formerly identified as *P. acerifolium*. Upon critical examination I am sure that it is identical with Merrill's new species collected by Levine at Canton. As the latter was based on a fruiting specimen only, I give here a complete description including that of the flowers based on Faber's specimen.

Syzygium gracilentum, comb. nov.

Eugenia gracilenta Hance in Journ. Bot. XXIII. 7 (1885).

Hance referred this species to the sect. Syzygium. Since it is better to separate Syzygium from Eugenia as a distinct genus, I propose this new combination.

Gilibertia acuminatissima, comb. nov.

Dendropanax acuminatissimum Merrill in Philipp. Jour. of Sci. XIII. 152 (1918).

Gilibertia Ruiz & Pavon was published in 1794 and Dendropanax Planchon in 1854. Nakai reduced the latter to a section of Gilibertia (see p. 22 of this vol.); in following him I propose this new combination.

Maesa Henryi, sp. nov.

Maesa castaneifolia Mez in Engler Pflanzenr. IV.–236 (Myrsinac.) 44 (1902), pro parte.

Frutex 1.2–1.8 m. altus. Folia elliptica vel lanceolata, 10–15 cm. longa et 3.5–5 cm. lata, acuminata vel acuta, basi subrotundata vel cuneata, remote serrata vel subintegra, supra glabra, subtus ad venas puberula; petioli ad 12 mm. longa. Inflorescentia diffuse paniculata, multiflora, glabra; pedicelli graciles, patentes: flores albi, in sicco pallide cremei; calycis lobi late triangulari-ovati, obtusi, patentes, tertiam partem corollae aequantes; corolla rotato-campanulata, lobis ovatis patentibus. Fructus succulentus, turbinatus vel subglobosus, 6 mm. longus, calycis lobis persistentibus patentibus coronatus; semina angulata, nigra.

Affinis *M. castaneifoliae* Mez, sed differt inflorescentia laxiore, corolla rotato-campanulata, fructu magis majore succulenta et seminibus nigris.

YUNNAN: Szemao, *A. Henry*, nos. 11625 (type) and 11625 A; *G. Forrest*, no. 16151.

SZECHUAN: Yangtze banks, *E. H. Wilson*, Veitch Exp. no. 4059, April, 1904; Bank of Yangtze, Chung chow, alt. 150 m., *E. H. Wilson*, no. 3257, April, 1908.

Tylophora Dielsii, comb. nov.

Hoyopsis Dielsii Léveillé in Fedde, Rep. Spec. Nov. XIII. 262 (1914).

Tylophora Hoyopsis Léveillé, Fl. Kouy-Tchéou, 44 (1914).

The combination made by Léveillé under Hoyopsis was not in accordance with the rules of nomenclature as he disregarded his former specific name given under his genus Hoyopsis, therefore a new combination is necessary.

Brandisia Hancei Hooker f., Fl. Brit. Ind. IV. 257 (1885).

Brandisia discolor Hance in Jour. Linn. Soc. XVIII. 299 (1880).—Non Hooker f. & Thomson.

Stellate-tomentose shrub 1.5 m. high, stem glabrous or scaberulous; branchlets usually densely rusty, woolly-tomentose, terete. Leaves opposite, ovate-lanceolate to oblong-lanceolate, acute, cordate at base, subentire or obsoletely serrate, with deciduous rusty tomentum when young and finally glabrous and with impressed veins above, densely rusty tomentose and with prominent veins beneath, thickly coriaceous, up to 5 cm. long and 2.5 cm. broad; petiole densely rusty-tomentose, about 5 mm. long. Flowers axillary, solitary or 2 together; peduncles 5–6 mm. long, pedicels up to 8 mm. long, both densely tomentose as well as the outside of the calyx; calyx broad-campanulate, 12 mm. long, 5-dentate, teeth broad, rounded-triangular, cuspidate, with strong midrib and 2 lateral veins, villosulose inside; corolla 2.5 cm. long, 12 mm. broad, tubular-campanulate, throat slightly swollen under the upper lip, tomentulose outside and inside, upper lip straight, subentire, 6 mm. long, lower lip shortly 3-lobed; stamens 4, didynamous, included; anthers rounded-reniform, attached at the back, covered with a long coarse beard in front; style very long, slightly dilated at the apex; stigma punctate. Capsule ovoid-globose, tomentose, 1 cm. in diameter, acute at the apex, subtended by the persistent calyx.

SZECHUAN, YUNNAN.

As there was never published a good and detailed description of this species since Hooker separated it from *B. discolor*, I take this opportunity to remedy the deficiency.

Tricalysia mollissima, comb. nov.

Diplospora mollissima Hutchinson in Sargent, Pl. Wilson. III. 401 (1917).

In reducing Diplospora De Candolle to a section of Tricalysia Richard, it is necessary to make this combination.

ARNOLD ARBORETUM,
October, 1924.

A NEW SPECIES OF REEVESIA

ERNEST H. WILSON

Reevesia sinica, sp. nov.

Reevesia Wallichii Dunn in Jour. Linn. Soc. XXXIX. 484 (1911).—Non R. Brown.

Reevesia pubescens Rehder & Wilson in Sargent, Pl. Wilson. II. 376 (1915).—Non Masters.

Arbor 20-metralis; truncus circuitu 1.5 m., cortice saturate cinereo, firmo, leviter rimoso; ramuli hornotini tomento fulvo stellato dense obtecti, demum glabrescentes et rubro-purpurei. Folia petiolata, coriacea, oblonga

vel elliptico-oblonga, rarius elliptica, 3–5 cm. (pleraque 8–12 cm.) longa et 1.5–6 cm. (pleraque 3.5–5 cm.) lata, integra vel rarius dentibus paucis remotis supra medium instructa, acuminata, rarius obtusa, mucronulata, basi rotundata vel truncata, interdum angustata, rarius leviter subcordata, utrinque nervis 3–6 curvatis et ascendentibus subtus elevatis supra leviter impressis, venulis reticulatis, supra sparse subtus dense pilis stellatis flavido-cinereis obtecta; petioli 1–3.5 cm. longi, villosi. Flores numerosi, in paniculam 3–9 cm. altam dispositi; pedicelli 0.5–1.5 cm. longi et rhachis stellato-pubescentes; bracteae et bracteolae membranaceae, lineares, 0.2–0.5 cm. longae, caducae; calyx infundibuliformis, 0.6–0.8 cm. longus, 5-dentatus, dentibus ovatis obtusis vel acutis, cinereo-stellato-pubescentibus; corolla alba, calyce duplo longior, petalis patentibus obovato-spatulatis margine undulatis et saepe sparse ciliatis, extus pubescentibus; columna staminalis longe exserta, 2–3.5 cm. longa, antheris flavis. Fructus lignosus pyriformis, 3.5 cm. longus et 2.5 cm. latus, sulcatus, apice depressus, basi acutus.

WESTERN CHINA. Szechuan: Monkong Ting, descent of the Pan-lan-shan, side of stream, alt. 2300 m., *E. H. Wilson*, no. 4395, October, 1910 (fruiting; type); cultivated Hort. Berckmans, Augusta, Ga., raised from Wilson's no. 4395, received Herb. Arnold Arboretum May 9, 1917 (flowers); cultivated Hort. J. C. Williams, Caerhays Castle, Cornwall, England, raised from Wilson's no. 4395, flowered August, 1924. YUNNAN: Mengtsze, alt. 1800 m., *A. Henry*, no. 11510; without precise locality, *G. Forrest*, nos. 15897, 17640.

In Sargent's Plantae Wilsonianae this tree is identified with *R. pubescens* Mast. from the mountains of Sikkim and Botan, but we had only fruiting specimens. Now with flowering material available obvious differences are apparent. It is certainly closely related to *R. pubescens* Mast. but in that species the leaves are thinner and cordate or rarely truncate at the base and the flowers, which are said to be pink, have linear-spatulate petals and shorter calyx teeth. The other Himalayan species *R. Wallichii* Br. with which Dunn confused this Chinese plant differs markedly in its thinner very sparingly stellate-pubescent leaves, truncate or rounded at the base, much smaller flowers and oblong fruit. The Chinese *R. thyrsoidea* Lindl., native of Hongkong, with which the Formosan *R. formosana* Kanehira is probably conspecific has smooth, shining, lanceolate to oblong, rarely elliptic leaves, narrowed or rounded at the base and quite glabrous and flowers about one-third the size of our new species, and a smaller fruit. In Fedde, Rep. Spec. Nov. IV. 330 (1907) Messrs. Léveillé and Vaniot briefly describe a plant as *R. Cavaleriei* but the description is too incomplete for definite identification, indeed, it is doubtful if it belongs to the genus.

I saw only one specimen of this interesting new Reevesia during my travels in China and that was growing in a remote district in western Szechuan where it was known as the "Soh-lou" tree. Both Henry and

Forrest collected specimens of this tree in Yunnan where it would appear to be more common than farther north. The tree I saw had rough firm gray bark, rather slender, spreading branches which formed a flattened round crown. Fortunately it bore ripe fruit and I was able to send a good supply of seeds to the Arnold Arboretum. These were widely distributed and germinated freely. A plant raised from these seeds flowered for the first time in cultivation in the nursery of P. J. Berckmans Company, Augusta, Georgia, early in May, 1917; in August of this year it flowered for the first time in England in the garden of Mr. J. C. Williams at Caerhays. With its terminal heads of white, fragrant flowers with protruding genitalia it is a singularly handsome tree. It has not proved hardy in the Arnold Arboretum and requires a mild genial climate in which to thrive.

NEW SPECIES, VARIETIES AND COMBINATIONS FROM THE HERBARIUM AND THE COLLECTIONS OF THE ARNOLD ARBORETUM [1]

ALFRED REHDER

Juglans notha (*J. regia* × *Sieboldiana*), hybr. nov.

Arbor ramis patentibus comam rotundatum formantibus; ramuli aurantiaco-flavidi vel cinereo-brunnei, puberuli et sparse crispo-pilosuli, secundo anno glabrescentes. Folia petiolo glanduloso-puberulo et crispo-pilosulo 8–10 cm. longo incluso 30–50 cm. longa, 7–9-foliolata; foliola elliptica vel oblongo-elliptica, 8–14 cm. longa et 4.5–7.5 cm. lata, terminale late ellipticum, 12–15 cm. longum et 8–11 cm. latum, apice subito breviter acuminata, basi obliqua truncata, remote et minute denticulata, supra glabra, subtus ad costam, venas et sparse ad venulas glanduloso-pubescentia, utrinque venis 10–15 instructa. Amenta mascula 4–5 cm. longa; flores bractea pubescente et perigonii lobis minute puberulis, filamentis brevissimis, antheris oblongis apice crista truncata instructis. Fructus subglobosus glanduloso-puberulus et pilosulus; nux globoso-ovoidea, circiter 3.5 cm longa, basi truncata, apice subito acuminulata, sutura elevata subalata, facie rugosa areolis vix elevatis, vel in altero specimine gibboso-rugosa et interdum in utraque parte leviter 3-costata; paries ossea lacunis 4 majoribus et 4 vel 5 minoribus instructa; dissipimentum osseum, circiter 1 mm. crassum, lacunosum, mediam nucem aequans vel paullulo superans.

SPECIMENS EXAMINED: Arnold Arboretum, cultivated under no. 14777 *A. Rehder*, October 9, 1921 and May 20, 1924; Hort. R. Bates, Jackson, South Carolina, *W. G. Bixby*, October 19, 1919 (as "Siebosian Walnut").

This hybrid was raised in this Arboretum in 1878 from seed sent by A. Lavallée from Segrez, France. Of the seedlings raised two trees have been growing here; one of them, which is now dead, was typical *J. Siebol-*

[1] Continued from p. 59.

diana, as herbarium specimens show, while the other which is still alive, shows clearly the influence of *J. regia*. It is a large tree about 18 m. tall with a round spreading head and a trunk 1.65 m. in girth and clothed with shallowly fissured gray bark. Its leaves differ from those of *J. Sieboldiana* in having only 7–9 leaflets which are comparatively broader, glabrous above and less pubescent beneath and on the margin only remotely and minutely denticulate with the minute mucro-like teeth about 5 mm. distant from each other. From *J. regia* the leaves are easily distinguished by the more numerous and larger leaflets remotely denticulate on the margin and pubescent on the midrib and on the veins beneath. The fruit is subglobose, less densely pubescent and less viscid than that of *J. Sieboldiana* and the nut is very much like that of *J. Sieboldiana* in its general appearance and structure except that the suture is less prominent and the apex only slightly and abruptly produced into a short mucro. The nut from the tree on Mr. Bates' place differs somewhat in being larger with a more prominent suture and a more rugose and gibbous surface, but in the foliage there is little or no difference.

Juglans notha var. **Batesii** (*J. regia* × *Sieboldiana* var. *cordiformis*), hybr. nov.

A typo hybridae differt nuce longiore magis ovoidea et acuminata, leviter compressa et leviter rugulosa—Folium unicum 7-foliolatum foliolis obtusioribus, ceterum ut in typo.

SPECIMENS EXAMINED: Hort. R. Bates, Jackson, South Carolina, *W. G. Bixby*, October 19, 1919 (as "Cording Walnut").

The nut of this hybrid differs little from that of *J. Sieboldiana* var. *cordiformis* except that it is longer and more ovoid and slightly rugose, but the leaf shows clearly the influence of *J. regia* and does not differ from that of typical *J. notha*.

Philadelphus Delavayi var. **calvescens**, var. nov.

Philadelphus nepalensis Diels in Notes Bot. Gard. Edinb. VII. 291, 292, nos. 5032, 5036 (1912).—Non Koehne.

Philadelphus Delavayi Stapf in Bot. Mag. CXLIV. t. 9022 (1924).—Non L. Henry.

A typo recedit foliis tantum subtus ad costam venasque et sparsissime ad venulas adpresse setoso-pilosis vel interdum fere glabris supra sparse adpresse setoso-pilosis, petiolis sparse adpresse pilosis vel glabris.

YUNNAN: "in collibus prope Lichiang versus occ.," *C. Schneider*, no. 1896, July 18, 1914 ("fl. albi, frut. ad 4 m."; type); Mo tao tsin, Kou ty, near Pe yen tsin, *Siméon Ten*, no. 469, April 15, 1917 (8–12 m.) and no. 543, 1918; eastern flank of the Tali range, alt. 3000–3300 m., moist open situations amongst scrub, *G. Forrest*, no. 5036, July–August, 1906 (flowers creamy white, fragrant; one of the three branches on the sheet in the Arnold Arboretum herbarium is referable to *P. Henryi* Koehne).

This variety which differs from the type chiefly in the glabrescent leaves

has been confused with *P. nepalensis* Koehne which, however, is easily distinguished by the leaves being glabrous or nearly so above and on the lower surface bearded near the base in the axils of the veins with long villous hairs, glabrous on the midrib and on the veins and light green, not glaucescent, by the longer and comparatively narrower stigmas and the green calyx. The variety occurs in the same region as the type of which I have before me specimens from the Lichiang range (*G. Forrest*, no. 2195, *C. Schneider*, no. 1806), from between Yung ning and Yung peh (*C. Schneider*, no. 3505) and without precise localities (*G. Forrest*, nos. 16211, 16412 and 1933), all in Yunnan and one from southern Szechuan, between Hunka and Woloho (*C. Schneider*, no. 1529).

The plant figured in Botanical Magazine was raised from seed sent by G. Forrest to England; the type was introduced to France by J. M. Delavay in 1888.

Neillia sparsiflora, sp. nov.

Frutex gracilis; ramuli hornotini floriferi pilis patentibus ad 2 mm. longis glanduliferis rubescentibus sparse vel interdum densius obsiti, ceterum glabri, annotini rubri vel rubescentes, glabri. Folia ovata vel ovato-oblonga, 3.5–6 cm. longa, longe acuminata, basi truncata vel subcordata, basi lobis 2 triangulari-ovatis acutis instructa, ceterum lobulata, inequaliter et fere dupliciter serrata dentibus acuminulatis, supra laete viridia et glabra, subtus pallidiora et costa venisque sparse glanduloso-pilosis et axillis barbatis exceptis glabra, venis utrinque 5–6; petioli glanduloso-pilosi, ceterum glabri vel apicem versus adpresse pubescentes, 1–1.5 cm. longi; stipulae ovato-lanceolatae, glandulose serrato-ciliatae, petiolo circiter duplo breviores, glabrae. Racemi 4–6-, vel interdum ad 12-flori, pedunculo gracili incluso 3.5–4.5 cm. longi; rhachis ut pedunculus pilis longis rubris glanduliferis sparsius vel densius obsita, ceterum glabra; bracteae lanceolatae, glanduloso-ciliatae, pedicellum 3–4 (in typo) vel 1–2 mm. longum superantes; calycis tubus urceolato-campanulatus, 7 mm. longus et in sicco 5–6 mm. latus, extus glaber, intus medio tantum villosulus; sepala ovato-lanceolata, acuminata, integra, 4 mm. longa, extus apicem versus leviter pubescentia, intus dense villosula; petala ovalia, 4.5–5 mm. longa, ciliolata et supra medium minute eroso-denticulata, ut videtur dilute rosea; stamina 20 et fere uniserialia (in typo) vel 25–30 et inaequaliter inserta (in specimine altero), longiora ad 2 mm. longa et sepala media superantia; ovarium supra medium pilosum, ovulis circiter 9; stylus 4.5 mm. longus, filamenta longiora fere aequans, stigmate parvo.

Northwestern Yunnan: Kou ty, near Pe yen tsin, *Siméon Ten*, nos. 462 (type) and 531, 1917 and 1918.

This species seems most closely related to *N. affinis* Hemsl. and to *N. longeracemosa* Hemsl.; from both species it is easily distinguished by the glabrous calyx-tube, the smaller, usually few-flowered raceme and the presence of long red gland-tipped hairs on the branchlets and on the rachis,

by which character it differs also from all other species of the genus known to me.

Prunus yedoensis var. **perpendens** Wilson, n. var.

This variety though marked by long pendent branches is identical with the type in flowers and foliage. It is growing on the estate of Mr. David Fairchild, Chevy Chase, Maryland, having been imported from Japan. It is a singularly attractive tree well worthy of wide cultivation. Probably this is the "Yoshino-shidare zakura" of the Japanese.

E. H. Wilson.

Thea Henryana, comb. nov.

Camellia Henryana Cohen Stuart in Mededeel. Proefstat. Thee Buitenzorg, XL. 132 (1916); in Bull. Jard. Bot. Buitenzorg, sér. 3, I. 290, t. 30, fig. 15 (1919).

CHINA: Yunnan, Szemao and Mengtze.

Thea Pitardii, comb. nov.

Thea speciosa Pitard apud Diels in Notes Bot. Gard. Edinb. v. 285 (1912).—Non Kochs.

Camellia Pitardii Cohen Stuart in Mededeel. Proefstat. Thee Buitenzorg, XL. 68 (1916); in Bull. Jard. Bot. Buitenzorg, sér. 3, I. 240 (1919).

CHINA: Yunnan.

Thea Crapnelliana, comb. nov.

Camellia Crapnelliana Tutcher in Jour. Linn. Soc. XXXVII. 63 (1904).

CHINA: Hongkong.

In his Thesis on the Tea plant Dr. Cohen Stuart (l. c. 57 [1916]; 232 [1919]) uniting as most botanists have done the two Linnaean genera Camellia and Thea, chose the name Camellia for the genus because Sweet in 1818 first united these two genera under Camellia and according to art. 46 of the International Rules of Botanical Nomenclature the name selected by the author who first unites two or more genera of the same date has to be accepted. In this case, the two names, however, though they both date from 1753, were not published at the same time, for Thea appeared on page 515 of vol. I. of Linnaeus' Species plantarum, while Camellia was published on p. 698 of vol. II. of the same work. As B. D. Jackson in a note on Linnaeus' Species plantarum (in Jour. Bot. LXI. 174 [1923]) shows conclusively, the two volumes were not published at the same date, but the first volume came out in May, 1753, while the second volume did not appear until August of the same year, therefore Thea has clearly the priority of Camellia. Dr. Cohen Stuart, when I drew his attention to B. D. Jackson's article and the inference to be drawn from it regarding the nomenclatorial question in the case of Camellia and Thea, agreed that it showed conclusively the priority of the name Thea and asked me to transfer those species of Camellia enumerated in his paper which had not yet received a binominal combination under Thea. This has been done above. Of the species enumerated by him without a com-

bination under Thea but which have already received a binominal under that genus I append the citations here.

Thea gracilis (Hemsl.) Hayata in Icon. Pl. Formos. VI. Suppl. 9 (1917).
Thea lutchuensis (Ito) Matsumura, Ind. Pl. Japan, II. 361 (1912).
Thea confusa Craib in Kew Bull. Misc. Inform. 1914, p. 5.

Of *Camellia Costei* Léveillé in Fedde Rep. Spec. Nov. X. 148 (1911) I have seen no specimens and as it is doubtful if the plant described by Léveillé belongs to this genus, I think it better to defer the coining of a new combination until the status of this plant has been clearly established.

Cornus dubia (*C. amomum* × *paucinervis*), hybr. nov.

Frutex ramis patentibus demum arcuato-dependentibus; ramuli hornotini subteretes, apice tantum leviter angulati pilis ferrugineis arcte appressis conspersi, supra purpurascentes, subtus virescentes, annotini glabri. Folia ovato-lanceolata vel oblongo-lanceolata, 5–8 cm. longa et 1.5–3.5 cm. lata, acuminata, basi late cuneata vel cuneata, supra laete viridia, lucidula, sparse appresseque pilosula, subtus pallide viridia, ad costam sparse pilis appresis ferrugineis albidisque mixtis sparse et ad venas sparsissime instructa, in facie sparse pilis appressis albidis conspersa; petioli 5–10 mm. longi, appresse breviterque pilosi. Corymbi longe pedunculati, 5–7 cm. diam., laxe pilis albidis ferrugineisque conspersi; sepala oblongo-lanceolata, glabrescentia, fere longitudine ovarii sericeo-pilosi; petala lanceolata, 5 mm. longa; filamenta et stylus apice manifeste clavatus, petalis circiter triente breviora. Drupa 6–8 mm. diam., appresse pilosula, maturitate initio intense coerulea demum fere nigra vel purpureo-nigra; putamen circiter 4 mm. altum et 4–5 diam., leviter compressum et leviter sed distincte costatum.

SPECIMENS EXAMINED: Arnold Arboretum, no. 13456, *A. Rehder*, July 2 and September 12, 1923.

This peculiar Cornus originated in the Arnold Arboretum apparently from seed of *C. paucinervis* Hance. It is clearly intermediate between this species and *C. amomum* Mill. and I have little doubt that it is a hybrid between these two species. From *C. paucinervis* it is clearly distinguished by larger and broader leaves with 3–4 not 2–3 pairs of veins, more distinctly ferrugineous-pilose on the veins beneath and of thinner texture, by the longer petioles usually 6–8, not 3–5 cm. long, and by the larger, more blue and earlier ripening fruit with a distinctly ribbed, slightly compressed stone and as broad or broader than high. From *C. amomum* it differs chiefly in the less deeply purple-colored and less densely pubescent branchlets, in the narrower leaves much less ferrugineous-pubescent beneath and with 3–4, not 4–6 pairs of lateral veins, in the smaller finally almost black, never light blue or whitish fruit with a smaller less strongly ribbed stone not or not much broader than high.

This new hybrid forms a wide-spreading bush with slender branches and produces in July its numerous corymbs on short branchlets along the arching branches; the fruits are profusely produced and of uniform dark blue or nearly black color.

Osmanthus ilicifolius Standish in Proc. Hort. Soc. Lond. II. 370 (1862), nomen.—Mouillefert, Arb. Arbriss. II. 982 (1896).—Nakai, Trees Shrubs Jap. I. 268 (1922).

Ilex Aquifolium Thunberg, Fl. Jap. 79 (1784).—Non Linnaeus.

Ilex Aquifolium var. *heterophylla* Ait.? apud Blume, Bijdr. 1150 (1860).—Non Aiton.

Olea ilicifolia Hasskarl, Cat. Hort. Bogor. 118 (1844).

Olea Aquifolium Siebold & Zuccarini in Abh. Akad. Muench. IV. pt. III. 166 (Flor. Jap. Fam. Nat. II. 42) (1846).

Osmanthus Aquifolium Siebold ex Siebold & Zuccarini, l.c. (1846), pro synon.—Bentham & Hooker, Gen. Pl. II. 677 (1876), "*O. aquifolia.*"

Olea aquifolia c. *ilicifolia* Dippel, Handb. Laubholzk. I. 141 (1891).

Osmanthus Aquifolium var. ***ilicifolius*** Nicholson in Kew Hand-list Arb. II. 89 (1896).

As the combination *O. Aquifolium* is based on a non-valid name, it can not be considered a valid binominal and has to be replaced by the combination with the next oldest specific name which is "ilicifolia." This change makes necessary the following new combinations, as Mouillefert (l.c.) published only *O. ilicifolius* var. *myrtifolius* and var. *latifolius*.

Osmanthus ilicifolius f. **variegatus,** comb. nov.

Osmanthus aquifolius variegatus Standish in Proc. Hort. Soc. Lond. I. 615 (1865).

Osmanthus Aquifolium var. *foliis argenteo-variegatis* Lavallée, Arb. Segrez. 169 (1877).

Osmanthus Aquifolium var. *argenteus* Bailey in Cycl. Am. Hort. III. 1177 (1901).

Osmanthus ilicifolius f. **aureus,** comb. nov.

Osmanthus Aquifolium var. *foliis aureo-variegatis* Lavallée, Arb. Segrez. 169 (1877).

Osmanthus Aquifolium var. *aureum* Bailey in Cycl. Am. Hort. III. 1177 (1901).

Osmanthus ilicifolius f. **purpureus,** comb. nov.

Osmanthus Aquifolium var. *ilicifolius purpureus* Nicholson in Kew Hand-list, II. 89 (1896).

Osmanthus Aquifolium var. *atropurpureus Schneider*, Ill. Handb. Laubholzk. II. 790 (1911).

Osmanthus ilicifolius f. **rotundifolius,** comb. nov.

Olea Aquifolium var. *rotundifolius* Jaeger, Ziergeh. ed. 2, 229 (1884).

Osmanthus Aquifolium var. *rotundifolius* Nicholson in Kew Hand-list Arb. II. 89 (1896).

Buddleia Davidii var. **nanhoensis,** comb. nov.

Buddleia variabilis var. *nanhoensis* Chittenden in Jour. Roy. Hort. Soc. XLVII. 193 (1922).

This variety of which plants are growing in this Arboretum differs from the other described forms chiefly in its lower stature with slender spreading branches, in the rather narrow, lanceolate leaves 7–12 cm. long and 1.5–3 cm. wide, gradually narrowed at the base into a very short petiole, and in the slender and rather loose inflorescence measuring only about 3.5 cm. through; the fragrant flowers are pale lilac with small orange eye and the corolla is quite glabrous outside with the limb about 8 mm. across.

This variety was introduced by R. Farrer in 1914 from near Kwanting in the Nan-ho valley, Kansu.

Viburnum acerifolium L. **f. ovatum,** f. nov.

A typo recedit foliis manifeste ovatis indivisis margine tantum repando-dentatis, eis in apice ramulorum steriliúm saepe integris vel fere integris et ovatis vel oblongo-ovatis.—Folia 6–12 cm. longa et 3.5–8.5 cm. lata, acuminata, basi cordata vel subcordata, subtus moiliter pubescentia; petioli 1–2 cm. longi; ceterum ut in typo.

NEW YORK: Cobs Hill near Rochester, *H. B. Slavin*, no. 4, June 10 and August 23, 1920 (type).

MASSACHUSETTS: steep rocky wooded slope, North Adams, Berkshire Co., *M. L. Fernald & Bayard Long*, no. 10461, June 23, 1913.

INDIANA: in a White Oak wood 2 miles east of Grayford, Jennings Co., *C. C. Deam*, no. 38593, May 30, 1923.

This form with its undivided ovate leaves looks quite distinct from the typical 3-lobed form and bears some resemblance to *V. affine* var. *hypomalacum* Blake but is easily distinguished by its longer-petioled, larger leaves, the smaller flowers and the differently shaped fruit. The specimen from Massachusetts has smaller leaves than the type, not exceeding 7 cm., and that from Indiana has the leaves more strongly toothed with broad triangular teeth.

Plants of this form received from Rochester in the autumn of 1920 are growing in this Arboretum.

Dipelta floribunda Maxim. var. **parviflora,** var. nov.

Dipelta yunnanensis F. N. Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Invent. Seeds Pl. Imp. XLII. 36, 54, nos. 39905, 40027 (1918).—Non Franchet.

A typo recedit foliis minoribus late ellipticis vel elliptico-lanceolatis 3.5–6 cm. longis subtus ad costam venasque sparsius breviusque pilosis, petiolus ramulisque glabrescentibus vel breviter puberulis, pedunculis ut videtur saepissime unifloris, pedicellis sparsius pubescentibus, sepalis subulatis 3–4 mm. longis, corolla circiter 2 cm. longa et sensim in tubum angustata, ovario apicem versus tantum hirsuto.

SPECIMENS EXAMINED: Arnold Arboretum, *A. Rehder*, June 12, 1924 (raised from cuttings sent by F. N. Meyer from Paoji, Kansu, to the U. S. Department of Agriculture in 1914 and distributed under no. 40027).

This variety differs from the typical form only in the smaller size and slighter pubescence of all its parts. It is not as ornamental as the type which has up to six flowers on a peduncle with the corolla varying between 2.5 and 3 cm. in length. As far as I know the species has not yet been recorded from Kansu.

Diervilla Middendorffiana Carr. **f. bicolor,** comb. nov.

Calyptrostigma Middendorffiana var. *bicolor* Regel in Gartenfl. VI. 4, t. 183 (upper two flowers) (1857).

SPECIMENS EXAMINED: Bot. Gard., Forst-Akad. Muenden, *H. Zabel*, Aug. 5, 1873 (as no. 18; received from Haage & Schmidt, Erfurt, in 1872).

This form differs from the type in the conspicuous purple markings on the lower lip. Regel states that the flowers are somewhat shorter than in the type, but the specimen before me has flowers about 4.5 cm. long; the leaves are rather thin and pilose beneath chiefly on the midrib and on the veins.

(*To be continued*)

ERRATA

Page 12, line 15 from below for *J. Hers*, no. 252, read *H. H. Hu*, no. 253.

" 13, line 23 and 24 from above change to

Kalopanax ricinifolium Harms & Rehder in Sargent, Pl. Wilson. II. 564 (1916).

Acanthopanax ricinifolium Harms in Mitt. Deutsch. Dendr. Ges. XXVII. t. 5, fig. A–D (1918).

" 13, line 26 and 27 for no. 602 *read* no. 602 in part.

" 13, line 28 from above for Fupe *read* Hupeh.

" 13, line 28 after *Silvestri* add no. 1601.

" 13, line 30 from above for 2020 *read* 12629 *and add* Huang tsauba Taipinggai, prov. Kweichou, *H. Handel-Mazzetti*, no. 10346.

" 21, line 15 from below for **arboricolum** read **arboricola.**

" 29, line 14 from above for *Nakai* read *Nikai.*

" 32, lines 3–9 from above strike out and replace by lines 17–23.

" 32, line 17 from above for Hsi *read* Hsien and transfer lines 17–23 to take the place of lines 3–9. The citations under ARALIA CHINENSIS var. NUDA (line 17–23) should be replaced by the following citations:

CHINA: near Chang hua, prov. Chekiang, *F. N. Meyer*, no. 1569; prov. Chili, *Père Chanet*, no. 83; Lushih, prov. Honan, *J. Hers*, no. 1151; Tai pei shan, prov. Shensi, *W. Purdom*, no. 1; South Wu-shan, prov. Hupeh, *E. H. Wilson*, no. 128[a]; Monte Triora, prov. Hupeh, *C. Silvestri*, no. 1609; Pan-lan-shan, prov. Szechuan, *E. H. Wilson*, no. 4386; Min valley, prov. Szechuan, *E. H. Wilson*, no. 4560; prov. Szechuan, *E. H. Wilson*, Veitch Exped. no. 3692; south of Red River, prov. Yunnan, *A. Henry*, no. 9479.

" 33, line 18 from above for 1840 *read* 1843.

" 35, line 11 from above for 1824 *read* 1843.

" 55, line 20 from below for XII *read* XIII.

" 55, line 13 from below for on-sieded *read* one-sided.

" 56, line 8 from below for 643 *read* 6431.

" 150, lines 9–11 from above change to

Litsea fruticosa (Hemsl.) Gamble in Sargent, Pl. Wilson. II. 77 (1914).

Benzoin fruticosum (Hemsl.) Rehder in Jour. Arnold Arb. I. 145 (1919).—Hers in Jour. N. China Branch R. As. Soc. LIII. 107 (1922); Liste Ess. Lign. Honan, 4(1922).

INDEX

Synonyms are printed in *italics;* new names in bold-face type.

Acanthopanax, 1
Acanthopanax, 7, 9, 11
— sect. Cephalopanax, 5
— — *Eleutherococcus*, 9
— — *Euacanthopanax*, 1, 2, 5, 9
— — *Evodiopanax*, 7
— — **Orthacanthopanax**, 1
— — Sciadophylloides, 7
— — *Zanthoxylopanax*, 1
— subsect. **Euacanthopanax**, 2
— — **Ionostachyae**, 4
— — **Zanthoxylopanax**, 1
— *acerifolium*, 12
— *aculeatum*, 1
— *asperatum*, 6
— **chiisanense**, 5
— **commixtum**, 4
— divaricatum, 6
— — **inerme**, 6
— *Eleutherococcus*, 10
— *evodiaefolius*, 8
— — *ferrugineus*, 8
— *Fauriei*, 10
— gracilistylum, 4
— Hondae, 3
— — **armatum**, 4
— — **inerme**, 4
— *hypoteucum*, 10
— *innovans*, 8
— *japonicum*, 4, 11
— **kiusianum**, 2
— **koreanum**, 3
— nipponicum, 2
— *pentaphyllum*, 11
— — *variegatum*, 11
— *ricinifolia*, 11
— *ricinifolium*, 11, 12, 13, 242
— — *Maximowiczii*, 11, 13
— sciadophylloides, 7
— *senticosus*, 10
— — *inermis*, 10
— *sepium*, 1
— sessiliflorum, 5
— *sessiliflorum*, 5
— spinosum, 3
— *spinosum*, 3, 4, 10
— — *inerme*, 4
— trichodon, 5
— *trichodon*, 11
— trifoliatum, 1
Acer Negundo, 127
— rubrum, 127
— — tridens, 127
— saccharinum, 126
— saccharum, 126
— — glaucum, 126
— *trifidum*, 23
Aesculus **arnoldiana**, 42
— *discolor* × *lutea*, 47
— *discolor mollis* × *neglecta*, 48
— *discolor mollis* × *neglecta georgiana*, 47
— **DuPontii**, 46
— — **Hessei**, 47
— *georgiana*, 45
— — *lanceolata*, 46
— — *pubescens*, 45
— glabra **monticola**, 41, 127
— *glabra* × *hybrida*, 42
— mutabilis, 47
— — **induta**, 48
— — **penduliflora**, 48
— neglecta, 43
— — **georgiana**, 45
— — — × *Pavia*, 47
— — **lanceolata**, 46
— — **pubescens**, 45
— — **tomentosa**, 46
— — × *Pavia*, 46
— octandra **vestita**, 42
— *Pavia mutabilis*, 47
Agalma, 19
— **lutchuense**, 20
— **taiwanianum**, 19
Akebia lobata, 137
— — australis, 138
— quinata, 137
Alnus rugosa, 120
Amelanchier asiatica sinica, 193
— *asiaticus*, 193
— canadensis, 124
Amorpha fruticosa, 125
— glabra, 125, 132
— tennessensis, 125
Amygdalus communis, 214, 215
— — *tangutica*, 215
— *pedunculata*, 216
— — *multiplex*, 216
— — *polygyna*, 216
— — *simplex*, 216
— *Persica*, 213

Amygdalus Persica multiplex, 214
— — *Potanini*, 215
— *pilosa*, 216
— *sp.*, 213
— *tangutica*, 215
Andromeda, 49, 54, 55
— sect. *Lyonia*, 54
— — *Maria*, 55
— — *Pieris*, 55
— *coriacea*, 50
— *elliptica*, 52
— *frondosa*, 50
— glaucophylla **latifolia**, 55
— *lacustris*, 51
— *lanceolata*, 52
— *ligustrina pubescens*, 50
— *lucida*, 50
— *marginata*, 51
— *mariana*, 51
— — *oblonga*, 51
— — *ovalis*, 51
— *myrtifolia*, 51
— *nitida*, 50
— *obovata*, 51
— *ovalifolia*, 52
— *paniculata foliosiflora*, 50
— — *tomentosa*, 50
— *polifolia latifolia*, 55
— *pulchella*, 51
— *squamulosa*, 52
— *tomentosa*, 50
— *villosa*, 53
Aralia, 27
— sect. *Dimorpanthus*, 28
— — *Ginseng*, 33
— — *Paratropia*, 21
— *canescens*, 30, 31
— chinensis, 31
— — *albo-marginata*, 31
— — *aureo-variegata*, 31
— — *canescens*, 30, 31
— — *elata*, 31, 32
— — *glabrescens*, 30, 32
— — **nuda**, 32, 242
— — *variegata*, 31
— cordata, 28
— — **sachalinensis**, 29
— Decaisneana, 32
— *edulis*, 28
— elata, 30
— — **aureo-variegata**, 31
— — **canescens**, 31
— — **variegata**, 31
— *Faribuki*, 15
Aralia glabra, 28
— hypoleuca, 29
— *japonica*, 16
— — *variegata*, 17
— *Laribuki*, 15
— *mandshurica*, 30
— *Maximowiczii*, 13
— *Milsude*, 23
— *nudicaulis*, 28
— *nutans*, 28
— *papyrifera*, 18
— *pentaphylla*, 3, 10
— Planchoniana, 32
— *quinquefolia Ginseng*, 35
— — *repens*, 33
— *racemosa sachalinensis*, 28, 29
— *repens*, 33
— *Sieboldii*, 16
— — *variegata*, 16
— spinosa, 129
— *spinosa*, 29, 30, 32
— — *canescens*, 30, 31
— — *glabrescens*, 30
Araliaceae Imperii Japonici, 1
Araliastrum, 32
Ardisia escallonioides, 49
— *paniculata*, 48
Arkansas and Oklahoma, The Ligneous Flora of, 108
Armeniaca Davidiana, 212
Arnold Arboretum, New Species, Varieties and Combinations from the Herbarium and the Collections of the, 49, 235
Arsenococcus, 54
— *frondosus*, 50
Ascyrum hypericoides, 128
— stans, 128
Asimina triloba, 123
Aspidopteris *nutans*, 228
— **orbiculata**, 228
Azalea myrtifolia, 103
— *ovata*, 103
Benzoin aestivale, 123
— cercidifolium, 150
— *citriodorum*, 149
— fruticosum, 150
— *fruticosum*, 242
— glaucum, 148
— obtusilobum, 150
— reflexum, 150
— umbellatum, 149
Berberis aggregata, 140
— amurensis, 143
— brachypoda, 142

Berberis aggregata salicaria, 142
— Caroli, 140
— — *hoanghensis*, 140
— *chinensis*, 140
— circumserrata, 139
— dasystachya, 142
— diaphana, 139
— — *circumserrata*, 139
— Dielsiana, 141
— *dolichobotrys*, 142
— dubia, 141
— Gilgiana, 142
— Giraldii, 143
— *Henryana*, 141
— *heteropoda oblonga*, 142
— *integerrima stenophylla*, 140
— *levis*, 138
— *Liechtensteinii*, 139
— *nepaulensis*, 144
— parvifolia, 139
— Poiretii, 140
— *Poiretii*, 141
— — weichangensis, 141
— Potaninii, 139
— Purdomii, 140
— *salicaria*, 143
— *sinensis*, 140, 141
— — *angustifolia*, 140
— — *crataegina*, 141
— Soulieana, 138
— *sphalera*, 139
— *stenophylla*, 138
— Vernae, 140
— *vulgaris*, 141, 143
— — *amurensis*, 143
— — *emarginata*, 141
— — *normalis*, 141
— *Wallichiana*, 138
Berchemia scandens, 127
Betula nigra, 120
Boerlagiodendron, 21
— **kotoense**, 22
— *pectinatum*, 22
Boninofatsia, 17
— **oligocarpella**, 17
— **Wilsonii**, 17
Brandisia *discolor*, 233
— Hancei, 233
Brassaiopsis, 11
— *ricinifolia*, 11
Buddleia Davidii **nanhoensis**, 240
— *variabilis nanhoensis*, 240
Bumelia lanuginosa, 130
Butea parviflora, 228
Callicarpa americana, 131
Calycanthus praecox, 148
Calyptrostigma Middendorffiana bicolor, 241
Camellia Crapnelliana, 238
— *Henryana*, 238
— *Pitardii*, 238
Carpinus caroliniana, 120
Carya alba, 120
— — ficoides, 120
— Buckleyi arkansana, 120
— cordiformis, 119
— — latifolia, 119
— ovalis obovalis, 120
Castanea Margaretta, 120
— ozarkensis, 120
Ceanothus americanus, 127
— ovatus, 127
Celtis Biondii, 73
— *Biondii*, 74
— — *heterophylla*, 73
— *Bungeana heterophylla*, 73, 74
— Leveillei, 73
— — **heterophylla**, 74
— — **holophylla**, 74
— laevigata, 122
— — texana, 122
— pumila, 122
— — georgiana, 122
— *sinensis*, 73
Cephalanthus occidentalis, 130
Cephalopanax sessiliflorum, 6
Cerasus spec., 221
Cercis canadensis, 125
Chaenomeles *japonica*, 185
— lagenaria, 185
— — Wilsonii, 185
— sinensis, 186
Chimonanthus fragrans, 148
Chinese Ligneous Plants, Notes on, 227
Chionanthus virginica, 131
Chosenia **eucalyptoides**, 72
— *splendida*, 73
Cocculus carolinus, 122
— *diversifolius cinereus*, 144
— *Thumbergii trilobata*, 145
— *Thunbergii*, 145
— trilobus, 145
Coprosmanthus japonicus, 72
Cordia thyrsiflora, 38
Cornus *amomum* × *paucinervis*, 238
— **dubia**, 239
— florida, 129
— obliqua, 129
Cotoneaster acutifolia, 176

Cotoneaster acutifolia *pekinensis*, 176
— — villosula, 176
— — *villosula*, 176
— adpressa, 175
— *crenulata*, 178
— Dammeri radicans, 178
— foveolata, 175
— gracilis, 177
— horizontalis, 175
— — perpusilla, 175
— melanocarpa, 176
— *microphylla*, 175
— *moupinensis*, 176
— multiflora, 177
— — calocarpa, 178
— *nummularius*, 177
— *Pyracantha*, 178
— racemiflora microcarpa, 177
— — soongarica, 177
— — *Veitchii*, 175
— *reflexa*, 177
— *sp.*, 176, 177
— *vulgaris*, 175
— Zabelii, 175
Crataegus apiifolia, 124
— *Bibas*, 69
— bracteata, 124
— Bushii, 124
— cuneata, 179
— dsungarica, 179
— hupehensis, 179
— *indica*, 65, 66
— *monogyna*, 180
— *Oxyacantha*, 180
— pagensis, 124
— pinnatifida, 180
— *pinnatifida*, 181
— — major, 181
— *rubra*, 66
— *sinensis*, 66
— *sp.*, 180
— spathulata, 124
— *spiralis*, 65
— straminea, 124
— Wattiana, 180
— Wilsonii, 179
Cudrania tricuspidata, 228
Cudranus trilobus, 228
Cydonia *japonica*, 185
— — *genuina*, 185
— oblonga, 184
— *sinensis*, 186
— *vulgaris*, 184
Daphne Gardneri, 82
Daphne papyrifera, 82
Daphniphyllum macropodum **Lhuysii**, 78
Decaisnea Fargesii, 137
— *insignis*, 137
Dendropanax, 22
— *acuminatissimum*, 232
— *japonicum*, 23, 24
— *morbiferum*, 22
— *spec.*, 24
— *trifidum*, 23
Desmothamnus, 55
— *nitidus*, 51
Deutzia albida, 154
— *Baroniana*, 155
— corymbosa, 158
— — *parviflora*, 157
— discolor, 154
— — *albida*, 154
— glabrata, 158
— *glaberrima*, 158
— *grandiflora*, 155
— grandiflora, 154
— — *Baroniana*, 155
— — glabrata, 155
— — *minor*, 154
— — *typica*, 154
— hamata, 156
— hypoglauca, 158
— *micrantha*, 157
— parviflora, 156
— *parviflora*, 156
— — *Bungei*, 156
— — **micrantha**, 157
— — *mongolica*, 156
— — ovatifolia, 157
— prunifolia, 156
— scabra, 154
— Vilmorinae, 154
Diervilla Middendorffiana **bicolor**, 241
Dimorphanthus, 28
— *edulis*, 28
— *elatus*, 30
— *mandshuricus*, 30
Diospyros virginiana, 130
— — platycarpa, 130
Dipelta floribunda **parviflora**, 241
— *yunnanensis*, 241
Diplofatsia, 18
— **polycarpa**, 18
Diplospora mollissima, 233
Dirca palustris, 128, 133
Distylium **gracile**, 77
— *racemosum*, 77

Eastern Asia, Some new and noteworthy ligneous plants of, 72
Echinocarpus sinensis, 230
Echinopanax, 14
— elatum, 15
— *horridum*, 15
— **japonicum**, 15
Edgeworthia, 81
— **albiflora**, 82
— chrysantha, 82
— *chrysantha*, 82
— Gardneri, 82
— *Gardneri*, 82
— longipes, 82
— papyrifera, 82
— *tomentosa*, 82
Ehretia acuminata, 37
— *acuminata*, 37, 38, 39
— — *grandifolia*, 38
— — laxiflora, 37
— corylifolia, 41
— Dicksoni, 39
— — **glabrescens**, 40
— — **japonica**, 40
— — **liukiuensis**, 40
— — **tomentosa**, 41
— — **typica**, 40
— *macrophylla*, 39, 40
— — *tomentosa*, 41
— *Onava*, 37
— *ovalifolia*, 38
— pilosula, 37
— polyantha, 37
— serrata, 39
— *serrata*, 38
— — *obovata*, 38
— — pyrifolia, 39
— **taiwaniana**, 38
— thyrsiflora, 38
— — latifolia, 38
— *virgata*, 37
Ehretiae quaedam Novae Asiaticae, 36
Elaeagnus **kiusiana**, 83
Elaeocarpus **kwangtungensis**, 229
— **yentangensis**, 229
Eleutherococcus, 9
— **hypoleucus**, 10
— **japonicus**, 10
— *japonicus*, 10
— — **variegatus**, 11
— *pentaphyllus*, 11
— senticosus, 9
— — *inermis*, 10
— — subinermis, 10
Enumeration of the Ligneous Plants of Northern China, II, 137
Erica *ciliaris Watsoni*, 56
— Mackaii **Watsonii**, 56
— *Tetralici-ciliaris*, 56
— *Tetralix Watsoni*, 56
— *Watsoni*, 56
Eriobotrya, 67
— **acuminatissima**, 71
— *ambigua*, 72
— bengalensis, 70
— *bengalensis*, 68
— — angustifolia, 70
— Brackloi, 68
— — atrichophylla, 68
— buisanensis, 70
— deflexa, 71
— — *buisanensis*, 70
— — **grandiflora**, 72
— *dubia*, 70
— fragrans,. 71
— *grandiflora*, 72
— *Griffithii*, 72
— **Henryi**, 70
— japonica, 69
— *lasiogyne*, 72
— **luzoniensis**, 69
— oblongifolia, 70
— obovata, 69
— philippinensis, 71
— prinoides, 68
— *prionophylla*, 72
— pseudo-Raphiolepis, 70
— tengyuehensis, 71
Eriobotryae Species Sino-Japonicae, Raphiolepidis et, 61
Eriolaena **glabrescens**, 231
— **szemaoensis**, 230
Eucommia ulmoides, 166
Eugenia gracilenta, 232
Evodiopanax, 7
— **evodiaefolium**, 8
— — **ferrugineum**, 8
— **innovans**, 8
Evonymus americanus, 126
— atropurpureus, 126
Exochorda Giraldii, 174
— *grandiflora*, 174
— racemosa, 174
— — *Giraldii*, 174
— — *Wilsonii*, 174
Fagara mengtzeana, 228
Fagus grandifolia caroliniana, 120
Fatsia, 16

Fatsia, 15, 18
— *horrida*, 15
— japonica, 16
— — **albo-marginata**, 16
— — *albo-marginata*, 16
— — **aureo-reticulata**, 17
— — *aureo-reticulata*, 17
— — **aureo-variegata**, 17
— — *aureo-variegata*, 17
— — **lobulata**, 17
— — *lobulata*, 17
— — **undulata**, 17
— — *undulata*, 17
— — **variegata**, 16
— *Mitsude*, 23
— *oligocarpella*, 17
— *papyrifera*, 18
— *polycarpa*, 18
Forsythia *suspensa*, 134
— *viridissima*, 134
— — **koreana**, 134
Forsythia viridissima var. koreana, 134
Fortunearia sinensis, 166
Fraxinus americana, 131
Gilibertia, 22
— sect. **Eugilibertia**, 22
— — **Dendropanax**, 22
— — **Textoria**, 22
— **acuminatissima**, 232
— *japonica*, 23
— **morbifera**, 22
— **sinensis**, 24
— pellucido-punctata, 24
— trifida, 23
Gleditsia triacanthos, 125
Gomphandra hainanensis, 229
Halesia monticola vestita, 130, 133
Hamamelis macrophylla, 123
— vernalis, 123
Hedera, 24
— *colchica*, 26
— **formosana**, 25
— *Helix*, 25
— — *colchica*, 26
— — *japonica*, 26
— — *japonica foliis variegatis*, 26
— — *rhombea*, 26
— — *rhombea argentea*, 27
— — *rhombea marginata*, 27
— — *rhombea ovata*, 27
— — *rhombea variegata*, 27
— — *submarginata*, 26
— *japonica*, 23, 26
— japonica, 25
Hedera japonica **argentea**, 27
— — **variegata**, 26
— **pedunculata**, 25
— *rhombea*, 23, 25
— — *variegata*, 26
— *senticosa*, 10
Heptapleurum, 21
Heptapleurum, 19
— subgen. *Agalma*, 19
— — *Eu-Heptapleurum*, 21
— arboricola, 242
— arboricolum, 21
— *octophyllum*, 20, 21
— *racemosum*, 19
Heynea trijuga microcarpa, 229
Hiraea nutans, 228
— *orbiculata*, 228
— *rotundifolia*, 228
Horsfieldia, 15
— *horrida*, 15
Hoyopsis Dielsii, 232
HU, H. H., Notes on Chinese Ligneous Plants, 227
Hupeh, The Rhododendrons of, 84
Hydrangea arborescens, 123
— Bretschneideri, 158
— — glabrescens, 159
— — *Giraldii*, 159
— — *setchuenensis*, 159
— *Giraldii*, 159
— *Hemsleyana*, 160
— "*Hortensie*," 160
— longipes, 160
— macrophylla, 160
— *pubescens*, 158
— Rosthornii, 160
— *serrata*, 159
— *spec.* "*Hortensie*," 160
— *vestita*, 158
— — *pubescens*, 158
— xanthoneura *glabrescens*, 159
— — setchuenensis, 159
— — Wilsonii, 159
Hypericum **oklahomense**, 128
— prolificum, 128
Ilex *Aquifolium*, 240
— — *heterophylla*, 240
— caroliniana, 126
— decidua, 126
— opaca, 126
Juglans nigra, 119
— **notha**, 235
— — **Batesii**, 236
— *regia* × *Sieboldiana*, 235

Juglans *regia* × *Sieboldiana cordiformis*, 236
Juniperus virginiana, 119
Kadsura chinensis, 147
Kalopanax, 11
Kalopanax, 1, 7
— *divaricatum*, 6
— *innovans*, 8
— ricinifolium, 11
— *ricinifolium*, 12, 242
— — **typicum**, 12
— — **chinense**, 13
— — **lutchuense**, 13
— — magnificum, 12
— — **Maximowiczii**, 13
— *sciadophylloides*, 7
Laurus umbellata, 63
Leucothoe sect. *Maria*, 55
— *coriacea*, 51
— *marginata*, 51
— *mariana*, 51
Ligneous Flora of Rich Mountain, Arkansas and Oklahoma, 108
Lindera cercidifolia, 150
— *glauca*, 149
— *membranacea*, 149
— *obtusiloba*, 150
— — *villosa*, 150
— *triloba*, 150
Liquidambar formosana, 166
— Styraciflua, 123
Litsea fruticosa, 242
Litsea vel *Lindera*, 149
Lonicera flava, 133
Lyonia, 49, 54, 55
— subgen. *Eulyonia*, 54
— — *Pieris*, 55
— Untergatt *Maria*, 55
— *frondosa*, 50
— *ligustrina pubescens*, 50
— *lucida*, 51
— *mariana*, 51
— *marginata*, 51
— *nitida*, 51
— *ovalifolia*, 52, 53
Maclura tricuspidata, 228
Machilus spec., 151
Maesa *castaneifolia*, 232
— **Henryi**, 232
Magnolia acuminata, 122, 132
— aulacosperma, 145
— *conspicua*, 146
— denudata, 146
— **Fordiana**, 228
— *Julan*, 146
Magnolia liliiflora, 146
— *obovata*, 146
— parviflora, 145
— *sericea*, 82
— *spec.*, 145
— *tomentosa*, 82
— tripetala, 122, 132
— *Yulan*, 146
Mahonia Bealii, 143
— *japonica*, 144
Malus baccata, 191
— *baccata*, 192
— — gracilis, 191
— — mandshurica, 192
— — × *prunifolia*, 192
— *domestica*, 190
— honanensis, 193
— kansuensis, 193
— — calva, 193
— prunifolia, 189
— — rinki, 190
— robusta, 192
— — persicifolia, 192
— *sp.*, 190
— spectabilis, 190
— theifera, 192
— toringoides, 193
— transitoria, 192
— — *toringoides*, 193
Manglietia Fordiana, 228
Maximowiczia chinensis, 147
Meliosma *Oldhami*, 80
— **sinensis**, 80
Menispermum canadense, 122
— dauricum, 144
— — pauciflorum, 144
Meratia praecox, 148
— — grandiflora, 148
Mespilus bengalensis, 70
— *japonica*, 69
— *pinnatifida*, 180
— *Sieboldii*, 63
— *sinensis*, 66
— *spiralis*, 65
Micromeles alnifolia, 183
— — *tiliaefolia*, 183
Morus rubra, 122
NAKAI, T., Araliaceae Imperii Japonici, 1
— Ehretiae quaedam Novae Asiaticae, 36
— Raphiolepidis et Eriobotryae Species Sino-Japonicae, 61
— Some new and noteworthy ligneous plants of Eastern Asia, 72
Nandina domestica, 138

Neillia sinensis, 167
— **sparsiflora**, 237
Neopieris, 55
— *mariana*, 51
— *nitida*, 51
New Species of Reevesia, A, 233
New Species, Varieties and Combinations from the Herbarium and the Collections of the Arnold Arboretum, 49, 235
North American Trees, Notes on, XII, 41
Northern China, Enumeration of the Ligneous Plants of, II, 137
Notes on Chinese Ligneous Plants, 227
Notes on North American Trees, XII, 41
Notes on the Genus Pinus, 225
Nyssa sylvatica, 129
Oklahoma, The Ligneous Flora of, Rich Mountain, Arkansas and, 108
Olea aquifolia ilicifolia, 240
— *Aquifolium*, 240
— — *rotundifolius*, 240
— *ilicifolia*, 240
Opa integerrima, 62
— *japonica*, 63
— *Mertensii*, 62
— *Metrosideros*, 65
— *spiralis*, 65
Oplopanax, 15
— *horridum*, 15
Opuntia humifusa, 129
Oreopanax, 19
— formosanum, 19
Osmanthus *Aquifolium*, 240
— — *argenteus*, 240
— — *atropurpureus*, 240
— — *aureum*, 240
— — *foliis argenteo-variegatis*, 240
— — *foliis aureo-variegatis*, 240
— — *ilicifolius*, 240
— — *ilicifolius purpureus*, 240
— — *rotundifolius*, 240
— *aquifolius variegatus*, 240
— ilicifolius, 240
— — **aureus**, 240
— — **purpureus**, 240
— — **rotundifolius**, 240
— — **variegatus**, 240
Osmoxylon kotoensis, 22
Osteomeles *anthyllidifolia*, 77
— — *boninensis*, 77
— **boninensis**, 77
— Schwerinae, 181
— *spec.*, 181
Ostrya virginiana, 120
Oxycoccoides japonicus sinica, 56
PALMER, ERNEST J., The Ligneous Flora of Rich Mountain, Arkansas and Oklahoma, 108
Panax, 32
Panax, 1, 15, 32
— subgen. *Acanthopanax*, 1
— — *Araliastrum*, 32
— — *Aureliana*, 33
— — *Eupanax*, 33
— — *Oplopanax*, 15
— *aculeatum*, 1
— *divaricatum*, 6
— *Ginseng*, 35
— — *japonicum*, 33
— — *japonicum dichrocarpum*, 34
— — *japonica trifoliolatum*, 34
— — *japonicum xanthocarpum*, 34
— — *repens*, 33
— — *repens trifoliolatum*, 34
— *innovans*, 8
— japonicum, 33
— — **dichrocarpum**, 34
— — **incisum**, 34
— — **lancifolium**, 34
— — **trifoliolatum**, 34
— — **typicum**, 33
— — **xanthocarpum**, 34
— *Loureirianum*, 1
— *quinquefolia coreensis*, 35
— — *Ginseng*, 35
— — *japonica*, 34, 35
— — *subsessilis*, 33
— *repens*, 33
— *ricinifolium*, 11
— schin-seng, 35
— — coraiense, 35
— — **cultum**, 35
— — **spontaneum**, 35
— — *japonica*, 33
— *sessiliflorum*, 6
— *spinosum*, 3
Paratropia, 19, 21
Parthenocissus quinquefolia hirsuta, 128
Pavia mutabilis, 47
Pellionia scabra, 228
Pentapanax, 27
— castanopsidicola, 27
Persica Davidiana, 215
— — *alba*, 215
— *Simonii*, 211
— *vulgaris*, 213
Philadelphus *coronarius*, 151
— — *pekinensis*, 151

Philadelphus *Delavayi*, 236
— Delavayi **calvescens**, 236
— incanus, 153
— — Baileyi, 153
— **laxiflorus**, 152
— *nepalensis*, 236
— pekinensis, 151
— — dasycalyx, 152
— pubescens, 123, 132
— — intectus, 123
— sericanthus, 153
— subcanus, 153
Phoradendron flavescens, 122
Photinia *buisanensis*, 70
— *defleza*, 71
— *dubia*, 70
— *luzoniensis*, 69
— — *acuminatissima*, 71
— *Sieboldii*, 63
— *spec.*, 184
— villosa sinica, 184
Physocarpus amurensis, 167
Pieris, 55
— sect. *Eupieris*, 55
— — *Maria*, 55
— Bodinieri, 54
— bracteata, 54
— *compta*, 53
— *coreana*, 54
— *elliptica*, 53
— *Fauriei*, 54
— *formosana*, 52
— Forrestii, 54
— *Henryi*, 53
— *lanceolata*, 52
— *lucida*, 51
— *mariana*, 51
— *nitida*, 51
— *ovalifolia*, 52, 53
— — *elliptica*, 53
— — *lanceolata*, 52
— — *pubescens*, 53
— *pilosa*, 52
— polita, 54
— *villosa*, 53
— — *pubescens*, 53
Pinus echinata, 119
— Krempfii, 227
Pinus, Notes on the Genus, 225
Pipa, 69
Pirus, see Pyrus
Pittosporum glabratum, 166
Platanus occidentalis, 123
— — glabrata, 124
Plectronia chinensis, 1
Polychroa **scabra**, 228
Populus balsamifera virginiana, 119
Potentilla *davurica*, 200
— — *mandshurica*, 200
— eriocarpa, 200
— fruticosa, 199
— — davurica, 200
— — mandshurica, 200
— — *ochreata*, 200
— — parvifolia, 200
— — *Veitchii*, 200
Prinsepia uniflora, 224
Prunus Armeniaca, 212
— — ansu, 212
— — *sibirica*, 213
— — × salicina, 212
— brachypoda, 223
— — pseudossiori, 223
— *Bungei*, 219
— *Cerasus*, 221
— communis, 214
— *communis*, 211
— Davidiana, 214
— — alba, 215
— — **Potanini**, 215
— dictyoneura, 218
— *domestica*, 211
— Giraldiana, 220
— glandulosa, 220
— — *Purdomii*, 219
— — Faberi, 220
— — sinensis, 220
— humilis, 219
— — *villosula*, 218
— incisa **gracilis**, 77
— japonica, 220
— *japonica*, 220
— — *glandulosa*, 220
— — *typica*, 220
— — *P. glandulosa*, 220
— — *var.*, 220
— kansuensis, 213
— lanata, 124
— *macrophylla*, 78
— macrophylla **sphaerocarpa**, 78
— mexicana, 124
— mume, 211
— Munsoniana, 124
— *nepalensis sericea*, 224
— Padus, 222
— — pubescens, 223
— — Purdomii, 223
— *pauciflora*, 221

Prunus *pauciflora aff.*, 220
— *pendula*, 221
— Persica, 213
— — albo-plena, 214
— — *Davidiana*, 215
— — duplex, 214
— — *necturina*, 211
— — *Potanini*, 215
— — *vulgaris*, 213
— *Petzoldii*, 217
— phyllopoda, 220
— pilosa, 216
— pilosiuscula, 222
— "Plumcot," 212
— pseudocerasus, 221
— — *Sieboldii*, 221
— salicina, 210
— sericea septentrionalis, 224
— serotina, 124
— serrulata pubescens, 222
— setulosa, 221
— sibirica, 213
— Sieboldii, 221
— Simonii, 211
— spec., 224
— *ssiori*, 223
— stipulacea, 220
— tangutica, 215
— *tenuiflora Nebelii*, 222
— tomentosa, 217
— — breviflora, 218
— — endotricha, 218
— — trichocarpa, 218
— — tsuluensis, 218
— *trichocarpa*, 218
— *triloba*, 217
— triloba, 216
— — **multiplex**, 216
— — *normalis*, 217
— — Petzoldii, 217
— — *plena*, 216
— — **simplex**, 216
— *triflora*, 211
— velutina, 224
— yedoensis **perpendens**, 238
Ptelea trifoliata, 125
Pterospermum Levinei, 231
Pyracantha *crenulata*, 178
— — kansuensis, 178
— Gibbsii, 178
Pyrus *Aria*, 184
— *Aucuparia*, 181, 182, 183
— *baccata*, 191
— — *mandshurica*, 191, 192
Pyrus *baccata sibirica*, 191
— betulaefolia, 188
— *betulifolia*, 189
— Bretschneideri, 186
— Calleryana, 188
— *communis*, 186, 187
— — *communis Pyraster*, 187
— — *sativa*, 187
— *Cydonia*, 184
— *discolor*, 181
— *japonica*, 185
— *kansuensis*, 193
— kolupana, 189
— *Malus*, 190
— — *glabra*, 189
— — *tomentosa*, 190
— *microphylla*, 183
— *ovoidea*, 186
— pashia, 189
— phaeocarpa, 188
— *pohuashanensis*, 182
— *prunifolia*, 190
— serotina, 187
— — culta, 187
— *serrulata*, 189
— *Simonii*, 186
— *sinensis*, 186, 187
— *spec.*, 188
— *spectabilis*, 190
— *transitoria*, 192
— ussuriensis, 186
— — ovoidea, 186
Quercus alba, 121
— borealis maxima, 121
— **Chenii**, 74
— **fokienensis**, 75
— *glandulifera*, 76
— — **brevipetiolata**, 76
— — **glanduligera**, 76
— *Griffithii glanduligera*, 76
— heterophylla, 121
— *Ilex phillyraeoides*, 75
— Muhlenbergii, 121
— Phellos, 121
— *phillyraeoides*, 75
— rubra, 121
— Shumardii Schneckii, 121
— stellata, 121
— — araneosa, 121
— — Margaretta, 121
— *urticaefolia brevipetiolata*, 76
— velutina, 121
— — missouriensis, 121
— **Wrightii**, 75

Raphiolepidis et Eriobotryae Species Sino-Japonicae, 61
Raphiolepis, 61
— *crataegoides*, 66
— *gracilis*, 64
— *indica*, 65, 66
— indica, 65
— — *angustifolia*, 64
— — **crataegoides**, 66
— — *grandifolia*, 61
— — latifolia, 67
— — mekongensis, 67
— — **phaeostemon**, 65
— — **spiralis**, 65
— — Tashiroi, 66
— — **typica**, 65
— integerrima, 62
— *japonica*, 62, 63
— — *integerrima*, 62, 63
— **liukiuensis**, 63
— *Loureiri*, 67
— major, 62
— *Mertensii*, 62
— — *ovata*, 63
— *minor*, 67
— *ovata*, 63
— *phaeostemon*, 65
— *pheostemonia*, 66
— rubra, 66
— — **foliosa**, 66
— — **lanceolata**, 67
— — **minor**, 67
— — **typica**, 66
— **rugosa**, 62
— salicifolia, 64
— *Sieboldii*, 63
— *sinensis*, 66
— *spiralis*, 65
— umbellata, 62
— *umbellata*, 64, 66
— — *liukiuensis*, 63
— — *Mertensii*, 62, 63
— — *minor*, 67
— — ovata, 63
Reevesia *pubescens*, 233
— **sinica**, 233
— *Wallichii*, 233
Reevesia, A New Species of, 233
Rehder, Alfred, Enumeration of the Ligneous Plants of Northern China, II, 137
— Forsythia Viridissima var. Koreana, 134
— New Species, Varieties and Combinations from the Herbarium and the Collections of the Arnold Arboretum, 49, 235
Rhamnus caroliniana, 127
Rhododendron adenopodum, 92
— *atroviride*, 102
— *aucubaefolium*, 105
— Augustinii, 100
— — **album**, 101
— — **violascens**, 101
— auriculatum, 98
— — **roseum**, 99
— *Benthamianum*, 102
— *chionophyllum*, 91
— *concinnum*, 102
— cornsutch, 89
— detersile, 90
— discolor, 96
— — **carneum**, 97
— Fargesii, 93
— — **album**, 95
— *Fortunei Houlstonii*, 95
— — *Kirkii*, 96
— *gracilipes*, 91
— holmleaense, 97
— Houlstonii, 95
— hypoglaucum, 91
— — **album**, 92
— *Kirkii*, 96
— konigdis, 97
— maculiferum, 89
— *mandarinorum*, 96
— Mariesii, 107
— micranthum, 103
— molle, 107
— oblongifolium, 129
— ovatum, 103
— pittosporaefolium, 105
— *praevernum*, 88
— roseum, 129, 133
— Simsii, 107
— *stamineum*, 105
— sutchuenense, 88
— — **Geraldii**, 89
— Wilsonae, 106
— yanthinum, 101
— — **album**, 103
Rhododendrons of Hupeh, The, 84
Rhus canadensis, 126
— glabra, 126
— copallina, 126
— Toxicodendron, 126
— trilobata, 126
Ribes acuminatum, 164
— — *minus*, 164
— *alpestre*, 165
— alpestre giganteum, 166

Ribes bureiense, 165
— *chifuense*, 163
— coeleste, 164
— curvatum, 123
— Cynosbati, 123, 132
— **emodense**, 161
— — **glandulosum**, 162
— — **urceolatum**, 161
— — **verruculosum**, 162
— *fasciculatum*, 163
— — chinense, 163
— Giraldii, 165
— glaciale, 164
— *grossularioides*, 165
— *himalayense*, 161, 162
— — *Decaisnei*, 162
— — *glandulosum*, 162
— — *urceolatum*, 162
— *himalense*, 161
— latifolium, 161
— *macrocalyx*, 165
— manshuricum, 161
— Meyeri, 162
— *moupinense*, 161
— — tripartitum, 161
— *multiflorum*, 161
— — *mandshuricum*, 161
— Maximowiczii, 163
— nigrum, 163
— *orientale*, 165
— *pauciflorum*, 163
— *petraeum*, 161
— — *mongolica*, 161
— pulchellum, 164
— — *inerme*, 164
— *rubrum*, 161
— stenocarpum, 166
— tenue, 164
— tricuspe, 164
— *tripartitum*, 161
Rich Mountain, Arkansas and Oklahoma, The Ligneous Flora of, 108
Robergia hirsuta, 229
Robinia Pseudoacacia, 125, 133
Rosa acicularis, 205
— *Banksiae*, 203
— Banksiae, 203
— — normalis, 203
— banksiopsis, 205
— bella, 206
— — **mongolica**, 206
— — pallens, 206
— Biondii, 207
— *cathayensis*, 201
Rosa chinensis, 203
— Davidii, 205
— davurica, 204
— Ecae, 210
— *eglanteria*, 209
— Giraldii, 207
— Hugonis, 208
— *indica*, 203
— *Luciae poteriifolia*, 202
— *macrophylla*, 205, 206
— *macrophylla hypoleuca*, 206
— — *mongolica*, 206
— Maximowicziana, 202
— microcarpa, 202
— *microphylla*, 203
— moschata, 202
— — *micrantha*, 202
— *multiflora*, 201
— multiflora, 201
— — *adenophora*, 201
— — carnea, 201
— — cathayensis, 201
— — Praegeri, 202
— — *var.*, 201
— omeiensis, 210
— *pimpinellifolia*, 208
— Prattii, 208
— Roxburghii normalis, 203
— Rubus, 202
— rugosa, 204
— *rugosa amurensis*, 204
— rugosa *Chamissoniana*, 204
— — Chamissoniana, 204
— — *ferox*, 204
— — *floribus plenis*, 204
— — *rubro-plena*, 204
— — **rubro-plena**, 204
— *sericea*, 210
— setigera tomentosa, 125
— *spec.*, 201, 206, 208, 209
— subserrulata, 125
— *Sweginzowii*, 210
— Sweginzowii, 207
— *Sweginzowii*, 206, 210
— tsinlingensis, 210
— Wichuraiana, 202
— *xanthina*, 209
— xanthina, 208
— — *normalis*, 209, 210
— — spontanea, 209
— *xanthinoides*, 208
Rubus acuminatissimus kansuensis, 199
— adenochlamys, 197
— amabilis, 195

Rubus Andrewsianus, 125
— biflorus, 195
— corchorifolius, 194
— — *typica*, 194
— coreanus, 196
— crataegifolius, 194
— *Davidianus*, 195
— *euleucus*, 196
— flosculosus, 197
— flagellaris invisus, 125
— frondosus, 125
— Giraldianus, 198
— *gracilis*, 196
— idaeus, 198
— — strigosus, 199
— innominatus, 198
— lachnocarpus, 198
— Lambertianus, 194
— — *hakonensis*, 194
— lasiostylus, 196
— mesogaeus, 198
— — oxycomus, 198
— *niveus*, 196
— occidentalis, 125
— parvifolius, 196
— pedunculosus, 196
— phoenicolasius, 197
— pileatus, 195
— piluliferus, 198
— pungens, 195
— — indefensus, 195
— *purpureus*, 196
— saxatilis, 194
— Sweginzowianus, 197
— *triphyllus*, 196
— — *adenochlamys*, 197
— — *purpureus*, 196
— xanthocarpus, 194, 199
SARGENT, C. S., Notes on North American Trees, XII, 41
Sassafras officinale, 123
Salix *acutifolia*, 73
— *eucalyptoides*, 72
— longipes Wardii, 119
— *nobilis*, 73
— nigra, 119
— *rorida*, 73
— *splendida*, 73
Schefflera sect. *Agalma*, 19
— — sect. *Heptapleurum*, 21
— *arboricola*, 21
— *octophylla*, 20
— *racemosa*, 19
Schisandra chinensis, 147
Schisandra propinqua sinensis, 147
— sphenanthera, 147
Schizandra chinensis, 147
SHAW, GEORGE RUSSELL, Notes on the Genus Pinus, 225
Sibiraea laevigata angustata, 173
Sinomenium acutum cinereum, 144
— *diversifolium cinereum*, 144
Sloanea **sinensis**, 230
Smilax Bona-nox, 119
— *china trinervula*, 72
— glauca, 119
— hispida, 119
— japonica, 72
— rotundifolia, 119
— *trinervula*, 72
Some new and noteworthy ligneous plants from Eastern Asia, 72
Sorbaria *arborea*, 174
— arborea glabrata, 174
— Kirilowii, 173
— *sorbifolia*, 173, 174
— — *Kirilowi*, 173
Sorbus alnifolia, 183
— *aperta*, 183
— discolor, 181
— Folgneri, 184
— Giraldiana, 182
— hupehensis, 183
— — aperta, 183
— Koehneana, 183
— *pekinensis*, 181
— pohuashanensis, 182
— *spec.*, 182
— tapashana, 182
Spatholobus **parviflorus**, 228
— *Roxburghii*, 228
Spiraea alpina, 168
— *angulata*, 172
— *betulifolia*, 172
— Blumei, 170
— cantoniensis, 170
— *crenifolia mongolica*, 168
— dasyantha, 169
— Fritschiana, 172
— — *angulata*, 172
— gemmata, 168
— hirsuta, 170
— hypericifolia, 167
— — *hupehensis*, 168
— — thalictroides, 168
— *japonica*, 172
— — *typica*, 172
— *Kirilowii*, 173

Spiraea longigemmis, 172
— media sericea, 169
— mongolica, 168
— prostrata, 168
— prunifolia, 167
— pubescens, 169
— *pubescens*, 171
— *sorbifolia*, 173
— trilobata, 171
— Wilsonii, 172
Staphylea trifolia, 126
Stemonurus **hainanensis**, 229
Stephanandra chinensis, 167
— incisa, 167
Stranvaesia **ambigua**, 72
Symphoricarpos orbiculatus, 131
Syzygium **gracilentum**, 232
Tapiria hirsuta, 229
Tapirira **hirsuta**, 229
Tetr[illegible]a Lhuysii, 78
Tetrapanax, 18
— papyriferum, 18
— *ricinifolium*, 12
Textoria, 22
— *japonica*, 23
Thea confusa, 239
— **Crapnelliana**, 238
— gracilis, 239
— **Henryana**, 238
— lutchuensis, 239
— **Pitardii**, 238
— *speciosa*, 238
Tilia floridana, 127
— — hypoleuca, 127
Tricalysia **mollissima**, 233
Turpinia *arguta*, 80
— **formosana**, 80
— **gracilis**, 79
— **lucida**, 80
— *nepalensis*, 79
— *pomifera*, 78
— — *nepalensis*, 78
— **ternata**, 78
Tylophora **Dielsii**, 232
— *Hoyopsis*, 232
Ulmus alata, 122
— americana, 122
— fulva, 122
Vanieria **tricuspidata**, 228
Vaccinium, 54
Vaccinium arboreum, 130
— — glaucescens, 130
— japonicum **sinicum**, 56
— stamineum, 130
— vacillans crinitum, 130
Viburnum acerifolium **ovatum**, 240
— molle **leiophyllum**, 57
— pubescens **Deamii**, 58
— — **indianense**, 59
— rufidulum, 131
Vitis cinerea, 128
— cordifolia, 128
— Linsecomii glauca, 128
— rotundifolia, 127
Walsura trijuga **microcarpa**, 229
Wendlandia glabrata, 83
Wendlandia Heyneana, 83
WILSON, ERNEST H., A New Species of Reevesia, 233
— The Rhododendrons of Hupeh, 84
Xolisma, 54
Xolisma, 49
— sect. **Arsenococcus**, 54
— — **Lyonia**, 54
— — **Maria**, 55
— — **Pieridopsis**, 55
— **compta**, 53
— ligustrina, 130
— — pubescens, 50
— **lucida**, 50
— **mariana**, 51
— — **vestita**, 51
— **ovalifolia**, 52
— — **elliptica**, 52
— — **lanceolata**, 52
— **villosa**, 53
— — **pubescens**, 53
Yucca glauca, 119
Zanthoxylum multifoliolatum, 228
— *trifoliatum*, 1

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TABLE OF CONTENTS

NOTES ON CRATAEGUS. By *C. S. Sargent* 1
SYNOPSIS OF NORTH AMERICAN CRATAEGI. By *Ernest J. Palmer* 5
ADDITIONS TO OUR KNOWLEDGE OF THE FLORA OF HAINAN. By *E. D. Merrill* .. 129
FURTHER NOTES ON CHINESE LIGNEOUS PLANTS. By *H. H. Hu* 140
TWO NEW TREES FROM CHEKIANG. By *Woon Young Chun* 144
TWO NEW GENERA OF BAMBUSACEAE, WITH SPECIAL REMARKS ON THE RELATED GENERA GROWING IN EASTERN ASIA. By *T. Nakai* 145
SYRINGA RUGULOSA, A NEW SPECIES FROM WESTERN CHINA. By *Susan Delano McKelvey* 153
AMELASORBUS, A NEW BIGENERIC HYBRID. By *Alfred Rehder* 154
THE RHODODENDRONS OF EASTERN CHINA, THE BONIN AND LIUKIU ISLANDS AND OF FORMOSA. By *Ernest H. Wilson* 156
JOSEPH BANKS: ICONES SELECTAE PLANTARUM QUAS IN JAPONIA COLLEGIT ET DELINEAVIT ENGELBERTUS KAEMPFER. By *T. Nakai* 186
CATALOGUE OF TREES GROWING NATURALLY IN THE VICINITY OF SARDIS DALLAS COUNTY, ALABAMA. By *R. S. Cocks* 189
IS QUERCUS ARKANSANA A HYBRID? By *Ernest J. Palmer* 195
RHODODENDRON CHRYSOCALYX LÉV. & VANIOT. By *Ernest H. Wilson* 200
NEW SPECIES, VARIETIES AND COMBINATIONS FROM THE HERBARIUM AND THE COLLECTIONS OF THE ARNOLD ARBORETUM. By *Alfred Rehder* 201
AMERICAN TREES AND SHRUBS IN THE PARK OF HATÁRMAJOR, RUMANIA 209
THE EXACT DATES OF PUBLICATION OF MIQUEL'S ANNALES MUSEI BOTANICI LUGDUNO-BATAVI AND PROLUSIO FLORAE JAPONICAE. By *T. Nakai* 211

NOTES 213
ERRATA 217
INDEX 219

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NOTES ON CRATAEGUS

C. S. SARGENT

Mr. Ernest J. Palmer in going critically through Crataegus in the Arboretum herbarium has made some interesting observations.

One of the most interesting of these is the fact that *Crataegus olivacea* (Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 153 [1910]) based on a specimen of the Crus-galli group collected in the valley of the Little Juniata River near Altoona, Pennsylvania, in 1905 by B. H. Smith in May and by C. S. Sargent in September, is the same as the plant cultivated in Europe for at least one hundred years as *Mespilus Fontanesiana* Spach and **Crataegus Fontanesiana** Steudel; also the plant raised from seeds received from the Paris Museum in 1876 and grown in the Arboretum as *Crataegus Fortunei*, an unpublished name, proves to be *Crataegus Fontanesiana*. This discovery is interesting as showing that the general opinion in Europe that *C. Fontanesiana* was of North American origin was correct.

Crataegus exigua Sargent (in Rhodora, v. 52 [February 1903]) is probably best considered, as pointed out by Eggleston (in Rhodora, x. 75 [1908]) as a variety of *Crataegus Crus-galli*, **C. Crus-galli** var. **exigua**. This plant must not be confused with the *C. exigua* of Ashe (in Jour. Elisha Mitchell Sci. Soc. XIX. 20 [1903]) from Wisconsin, said to be a species of *Tenuifoliae*, but not represented in the Arboretum herbarium.

Crataegus Crus-galli L., after a longer study of the genus, must be considered more widely distributed and more variable in the shape of the leaves than was formerly believed; and Mr. Palmer rightly suggests that *C. strongylophylla* Sargent (in Rep. Mo. Bot. Gard. XIX. 44 [1908]) from Webb City, Missouri, cannot be distinguished by any good character from the Linnaean species and must be considered a synonym of it.

Crataegus arduennae Sargent. To this *Crus-galli* species with 10 stamens and yellow anthers, first noticed at Glenellyn, Illinois, may probably best be referred the following Missouri plants as synonyms: *Crataegus ferox* Sargent (in Rep. Mo. Bot. Gard. XIX. 52 [1908]); *C. albanthera* Sargent (l. c. 53); and *C. candens* Sargent (l. c. 55).

Crataegus sordida var. **villosa**, n. var.

The typical form of *C. sordida* Sargent (in Bot. Gaz. XXXIII. 114 (1902]), a *Punctatae* species from southeastern Missouri, collected by B. F. Bush at Pleasant Grove, is quite glabrous with the exception of a few scattered hairs on the young branches and inflorescence which become glabrous before autumn, but two trees discovered by Palmer growing together on the border of upland woods near Fulton in southern Arkansas in 1914, differ so distinctly in their densely villose young branches, corymbs and calyx with matted hairs more or less persistent during the season that it seems necessary to consider these trees as representing a variety for which I propose the name *villosa*. As the type of this variety may be taken Palmer's Nos. 20,709 and 22,266, collected April 5 and October 11, 1922. To this variety should also be referred specimens from Williamsville, Missouri, collected first by *B. F. Bush*, April 25 and October 10, 1912 (Nos. 6649, 6941) and by *Palmer*, June 30, 1914 (No. 6147), April 20 and October 9, 1920 (Nos. 17,204, 17,245, 19,413, 19,414).

Crataegus furcata Sargent (in Rep. Mo. Bot. Gard. XIX. 86 [1908]) was based on a shrub forming thickets on limestone hills near Carterville and Webb City in southwestern Missouri. It has since been found by Mr. Palmer, who has seen many thousands of these plants, that when it descends into valleys along streams in that part of the state it then grows as a tree indistinguishable from the widely distributed **C. viridis** Linnaeus of which *C. furcata* must be considered a synonym.

Crataegus ignava has been used for two different plants, first by Beadle in 1901 for a species of the *Flavae* group and second by Sargent in 1910 (in Proc. Acad. Nat. Sci. Phila. LXII. 228) for a handsome shrubby species of the *Pruinosae* group first collected in 1909 near Bedford Springs, Bedford County, Pennsylvania, by the late Benjamin H. Smith of Philadelphia, for which I now propose the name of **Crataegus neosmithii**.

The name of *Crataegus ampla* has been given by Sargent to two different plants, the first a species of *Tenuifoliae* from Kutztown, Pennsylvania, published in September, 1905, and the second a species of *Coccineae* from Lanesboro, Massachusetts, published in November, 1905 (in Rhodora, VII. 208). For the Massachusetts species the name **C. neofaxonii** is now proposed, this plant having been discovered in 1899 by the late Charles E. Faxon.

Crataegus Ridgwayi, n. sp.

Leaves ovate, acute or acuminate at apex, broad and rounded or slightly cordate or occasionally cuneate at base, usually slightly lobed with acuminate lobes, and sharply often doubly serrate, scabrate above early in the season by short early deciduous hairs and villose below, especially on the midrib and veins, dark green on the upper surface, rather paler on the lower surface, 4.5–8 cm. long and 3.5–8 cm. wide; petioles slender,

densely villose when the flowers open, becoming nearly glabrous, 1.2–3 cm. in length; stipules oblanceolate, long-acuminate, coarsely glandular-serrate, 1–1.2 cm. long, deciduous in May. Flowers opening early in April, 2 cm. in diameter, in compact many-flowered villose corymbs, furnished with deciduous hairs; calyx-tube glabrous, the lobes narrow-acuminate, coarsely glandular-serrate, glabrous on the outer surface, sparingly villose on the inner surface; stamens 20; anthers "brownish gray"; styles 2 or 3, surrounded at the base by a conspicuous tuft of long white hairs. Fruit subglobose to short-oblong, scarlet, 1.5 cm. in length; nutlets 5, acute at the ends, broadest at the apex, obscurely grooved on the back, 6–8 cm. in length.

A slender tree 4–5 m. high with a trunk rarely more than 15 cm. in diameter, and spreading branches; common in open woods, growing on creek bottoms and dry uplands near Olney, Richland County, southeastern Illinois, *R. Ridgway*, May 14, 1921, April 29 and August 20, 1924 (Nos. 1375, 2087 & 2041, type); *E. J. Palmer*, May 14, 1923 (No. 22615).

Judging by the habit of this tree and the shape of the leaves it is an unusually small-fruited *Molles* species approaching in the size of the fruit plants of the *Coccineae* group which, although common in northern Illinois, is not found as far south anywhere as Richland County.

I am glad to associate with this interesting plant the name of Robert Ridgway, the distinguished ornithologist.

× **Crataegus Whitakeri**, n. hyb.? (*Molles* sp.? × *Macracanthae* sp.?).

Leaves broad-ovate, acute, rounded or abruptly or gradually narrowed at base, often slightly divided into short acute lateral lobes and coarsely and irregularly serrate with acute teeth, sparingly villose below, especially on the midrib and primary veins, becoming nearly glabrous in the autumn, dark green on the upper surface, rather paler on the lower surface, 8–10 cm. long and 6–7 cm. wide; petioles stout, densely villose early in the season, becoming glabrous or nearly glabrous, and 8–15 mm. in length. Flowers opening early in June, 2 cm. in diameter, on slender pedicels densely villose like the 6–12-flowered rather compact corymbs; calyx thickly covered with matted pale hairs, the lobes glandular-serrate, nearly glabrous above, densely villose below, deciduous or persistent on the fruit; stamens 20; anthers "pale green fading to blackish"; style surrounded at the base by a conspicuous tuft of white hairs. Fruit ripening early in October, on stout pedicels, in nearly glabrous few-fruited clusters, subglobose to ovoid, crowned by the persistent calyx-tube, orange red, up to 1.5 cm. in diameter; nutlets 2, ellipsoid, often slightly broader at the apex, rounded or slightly ridged on the back, furnished on the inner surface with irregular shallow depressions or ocassionally with a short deep pit, 1–1.2 cm. long, 1 cm. wide.

A tree from 5–6 m. tall, with a trunk 3.5 dm. in diameter, a wide head of spreading branches and stout branchlets without spines in the Arboretum specimens.

In an upland field of the Page Whitaker farm, Richland County, southeastern Illinois, *Robert Ridgway*, October 7, 1923 (No. 2057, type for fruit), June 2, 1924 (No. 2105, type for flowers). Small trees in an adjoining field are believed by Dr. Ridgway to be seedlings from this tree (Nos. 2057 and 2105) but of these I have seen no specimen.

In habit, spreading branches, stout large branchlets and large leaves it resembles a *Molles* species, while in the shape of the leaves, the size and color of the soft fruit, the two nutlets and the nature of their lower surface it resembles a *Macracanthae* species.

Crataegus coccinioides Ashe, a species of the *Dilatatae*, grows in the neighborhood of St. Louis and is common near Allenton and Pacific, Missouri. If *C. speciosa* Sargent (in Trees and Shrubs, I. 65 [1903]) is considered a synonym of Ashe's species, as the examination of a large amount of material recently collected by Palmer seems to justify, the range of this species must be extended to southwestern Missouri, Galena, Cherokee County, Kansas, and to the neighborhood of Farmington, Washington County, Arkansas. Ashe includes southern Illinois in the range of his species but I have seen no specimen from east of the Mississippi River.

Crataegus cupulifera Sargent (in Rochester Acad. Sci. IV. 129 [1903]) was referred to the *Macracanthae* by me in the New York State Bull. 167, 119 (1913) but it really belongs to the *Rotundifoliae* group, and **C. simulans** Sargent (in New York State Bull. CXXII. 125 [1908]) which was later referred by me to *C. cupulifera* as a synonym, belongs as originally described to the *Anomalae*.

Crataegus Wheeleri, an *Intricatae* species from Grand Rapids, Michigan, was published by Sargent in 1907 (in Rep. Geolog. Surv. Michigan, 1906, 552) and is found to be a homonym, a *C. Wheeleri* from Colorado which probably belongs to *C. Douglasii* having been published in 1902 by Nelson (in Bot. Gaz. XXXIV. 369). There is not a specimen of Nelson's plant in the herbarium of the Arboretum. **Crataegus diversifolia**, with broad or narrow ovate leaves of the fruiting branches becoming sometimes distinctly 3-lobed on vigorous sterile shoots, may be adopted as the name of *C. Wheeleri* of Sargent.

Crataegus padifolia var. **incarnata**, n. var.

Leaves ovate, acute and short-pointed at the apex, rounded or abruptly narrowed at the base, acutely and frequently doubly serrate, and often slightly divided into short acute lateral lobes, glabrous with the exception of a few caducous hairs on the upper side of the midrib early in the season, thin, dark green above, slightly paler below, 3–5.5 cm. long and 3–5 cm. wide, with a slender midrib deeply impressed on the upper side, and usually 5 or 6 pairs of slender primary veins; petioles slender, more or less glandular, with glands generally persistent during the season, usually about 1.5

cm. in length; stipules oblanceolate, glandular-serrate, caducous. Flowers 1.5 cm. in diameter, in small mostly 5- or 6-flowered corymbs, furnished with broad conspicuously glandular-serrate deciduous bracts; calyx glabrous with narrow acuminate glandular-serrate lobes often persistent on the ripe fruit; stamens 7–10; anthers pale pink; styles 2–4. Fruit ripening in early October, subglobose, dull crimson, punctate, about 1.5 cm. in diameter; nutlets 3–4, rounded on the back and ends, slightly broader at the apex than at the base, 5–6 mm. in length.

Usually a shrub from 4.5–5 m. high, with stout stems covered with dark corky bark, and erect or ascending branches armed with numerous slender straight or slightly curved dark purple spines 4–5 cm. in length; or often a small tree 5–6 m. high.

Rocky limestone hills near Galena, Stone County, Missouri, *E. J. Palmer*, October 13, 1913 (No. 4645, type for fruit), September 27, 1920 (No. 19,183), April 29, 1924 (No. 24,569, type for flowers), all from plant No. 3; same locality, May 23, 1923 (No. 22,798), April 29, 1924 (No. 24,568). Rocky upland woods, near Cotter, in Marion County, Arkansas, *E. J. Palmer*, June 18, 1914 (No. 6026).

The specimens of Mr. Palmer's plant No. 3 can probably best be regarded as a variety of *C. padifolia* of the *Intricatae* group which occurs in this region, and from which it differs in its generally broader and usually slightly lobed leaves and in its larger and softer crimson fruit.

Crataegus panda has been used for two different plants, first by Beadle in 1902 (Biltmore Bot. Studies, I. 89) for a shrubby species of the *Flavae* group from the neighborhood of Tallahassee, Florida, and second by Ashe in 1903 for a plant from Glendon, N. Carolina (in Jour. Elisha Mitchell Sci. Soc. XIX. 29). The description does not give the group to which this plant belongs and there is not a specimen in the Arboretum herbarium.

Crataegus cirrata was used in 1902 by Beadle (Biltmore Bot. Studies, I. 101) for a shrubby species of the *Flavae* group from Girard, Alabama. The same name was used in 1916 by Ashe (in Bull. Charleston Mus. XII. 42) for a plant from Georgia, no information being given of the type locality or of the group to which it belongs. Ashe's plant is not represented in the Arboretum herbarium.

SYNOPSIS OF NORTH AMERICAN CRATAEGI

ERNEST J. PALMER

INTRODUCTION

The following alphabetical list and synoptical tables of the North American species and varieties of the genus Crataegus was compiled several years ago, in a somewhat different form, for use in the Herbarium of the Arnold Arboretum. It was not intended for publication and was

designed merely for convenient reference and to facilitate the identification of material. The very unusual size of this genus in number of species, the bulk of material in our herbarium and the large accessions constantly accumulating, as well as specimens and collections frequently being received for identification from various parts of the country became so burdensome, even with the ample library and collection of types available here, that it was thought worth while to bring together in as compact a form as possible a synopsis of the information scattered through many publications and indices. It was hoped also that it might at some future time serve as the basis for a fuller study and more complete key to the genus. It is published with some reluctance at this time in the hope that it may prove of wider use and convenience to students of American Crataegus, especially to those who do not have access to much of the original literature or to the collections of the larger herbaria.

It is intended in the index to give a list as complete as possible of the specific and varietal names that have been applied to North American Crataegi. Possibly some names have escaped the writer's attention that should have been included, and many of those listed are given only for reference. No attempt is made to give a complete synonymy under valid names nor of combinations under other generic names. Specific names that have been variously interpreted by different botanists are included but once, exception being made in a few cases where it seems evident that duplication occurred through coincidence and that the authors were referring to different plants. Several instances of this sort will be noted, some of which are corrected in a paper by Professor C. S. Sargent appearing in this issue.

As this paper is not intended as a critical study in the sense of a revision of the genus, I have carefully refrained from making new combinations and so far as possible from going into the question of the validity of names that have been published. However, for the sake of clearness it was found necessary to indicate that certain names are recognized synonyms of others and where these have been used both as of specific and varietal rank to designate the preferred form. In such cases the practice prevailing at present in the Herbarium of the Arnold Arboretum has naturally been followed and names regarded as synonyms are printed in italics. A few obvious orthographical errors in previous publication of names have been corrected and for the sake of uniformity the practice of doubling the final i after consonants except after the ending "er," as recommended in the International Rules of Nomenclature, has been adopted for all names recognized as valid.

The question of synonymy and priority of names in this genus is much complicated by the fact that many North American species were first named from specimens cultivated in European gardens. These names were often without adequate descriptions or figures or with none at all, and in almost all cases without any definite records as to the part of the

country from which the seeds or plants were derived. North America was usually considered sufficiently definite and all of the eastern parts of the continent might be included under the general designations Carolina, Virginia and Canada. These early names were in many cases taken up and variously interpreted by later writers. Some of them, through study of the type specimens where they exist or of the plants still in cultivation have been found to have precedence over later names and more careful study will probably reveal other such cases. It is possible too that duplicate descriptions of some identical plants have been published under different names by later authors working independently.

The species have as far as possible been referred to the natural sections or groups to which they belong, those recognized being the twenty wholly or partially arborescent groups of Sargent's Manual of the Trees of North America and two additional shrubby ones, Uniflorae and Pulcherrimae. Perhaps two or three other small groups should be included in a fuller treatment of the North American species, at least in the writer's opinion. The distinctions between these groups are usually clear but in some cases there is an apparent merging of characters and it is difficult to say to which of two sections certain species belong. Where the group was indicated by the author of the species his treatment has usually been followed when the species comes within the recognized sections, although in a few instances there was some doubt in the writer's mind as to the correctness of the reference. Where the original description does not make the group clear and no specimens were available for examination I have seldom ventured to supply it and such species are necessarily excluded from the synoptical tables. These, with other debatable names that could not definitely be assigned to synonymy and all others of which I have not seen specimens, are indicated by a question mark in parenthesis.

The geographical range is given usually by states and provinces except in the cases of a few widely distributed species where it did not seem necessary to enumerate all political divisions. Where a wider range is indicated than that given in earlier publications it is in all cases based upon specimens examined, most of which are in the Arnold Arboretum Herbarium. In giving type localities, details have sometimes been supplied from the type specimens where these were available.

The synoptical tables were designed merely as a temporary substitute for a more complete key to the genus, the idea being to bring together species having common characters into small groups so that in connection with the geographical range only a few would have to be considered in identifying material. Like ordinary keys they are of course expected to be used only as guides to the fuller descriptions of the manuals.

In these tables the color of the anthers, number of stamens, glabrous or pubescent character of corymbs at flowering time and general shape of

the leaves were adopted for most of the groups, in the order named. This arrangement may not prove entirely satisfactory for a fuller treatment, but these characters were selected after much experimenting for two reasons: First, because they have been clearly stated and emphasized in most of the descriptions of recently proposed species, and second, for the sake of definiteness. It is extremely difficult to find in dealing with a genus like Crataegus, in which the number of species is so great and the differences between them in many cases slight, any common character that will hold good throughout a large series. The taxonomic value of characters varies in different groups, but generally there appears to be considerable variability even within the species in such particulars as the size of the flowers, the number in the corymbs and the compactness or laxity of the latter. The shape of the leaves is even less stable and dependable, many types often being found on a single branch; certain sorts of serration characterize some species, but in most there is much variability and differences are only relative; the texture and veining of the leaves is sometimes characteristic, but this is often modified by ecological conditions; the color of foliage, though not without significance, is subject to similar modification. The fruit is often one of the best guides to group distinctions, but there is quite too much variation in such particulars as shape, size and color for them to be depended upon rigidly as specific criteria. The number and shape of the nutlets is rather constant in some groups and quite variable in others; but these differences likewise, though furnishing in a few exceptional cases a distinction between closely allied species, usually serve merely as a guide to the group. Even the presence or absence of pubescence on the corymbs, often one of the best specific distinctions, cannot always be relied upon. In the color of the anthers, if not too narrowly defined, is to be found at least a distinction that is definite and not one of degree. Certain species seem to be characterized by having anthers of the yellow group of shades and others by those of shades that may generally be called red. These differences are often more or less distinctly correlated with the color of the fruit and shade of foliage, especially in its autumnal aspect.

In the number of stamens there is greater variability and they must be taken with less confidence and greater latitude as specific distinctions. As the flowers of this genus are 5-merous these organs normally appear in multiples of five. Thus in certain species, especially in the Tenuifoliae group, five appears to be the normal number, and these vary in individual flowers from four to seven or rarely eight. There is a double series in another large array of species in which the number may be expected to vary through suppression or redundancy between eight and twelve or fifteen, although in the great majority of flowers it is actually ten. In many species the series is again doubled and we find twenty stamens or rarely a few more or less. Considerable field observation and study

of specimens in cultivation seems to indicate that these characters, as thus liberally defined, generally breed true in seedlings. Exceptions may be expected in the case of hypothetical hybrids. It would therefore appear that the number of stamens and color of anthers furnish one of the most definite criteria for distinguishing between species, although perhaps conclusive only when combined with other important though variable morphologic characters; and they can scarcely be ignored, especially in the construction of keys, unless we are willing to adopt a much broader conception of a few variable and composite species. This of course involves a controversial question upon which there is the widest latitude for difference of opinion, and which is beyond the province or purpose of this paper. It is perhaps safe to say, however, that no competent student of the genus today would be willing to consider returning to the score or so of species recognized by the botanists of a few decades ago.

A brief synopsis of the fruit characters is given in the tables following the name of each species. These have in almost all cases been taken from the original descriptions and it should be remembered that a considerable deviation from some of these specifications may be expected in individual plants under varying ecological conditions. At least a wide acquaintance with many of the species in the field and observation of specimens under cultivation has led me to this conclusion. In a few cases where it seemed evident that errors had occurred in the original descriptions or where the examination of a series of specimens showed too wide a departure from these descriptions, corrections have been made. The question mark in parenthesis (?) following name of species and author, indicates that specimens have not been seen or that the position of the species in the tables is not definitely determinable from the description drawn upon.

ALPHABETICAL LIST OF SPECIES AND VARIETIES WITH SECTION AND RANGE

CRATAEGUS

abbreviata Sargent in Jour. Arnold Arb. III. 187 (1922).—**Crus-galli.**—Texas (type locality: Brazoria).

abdita Beadle in Biltmore Bot. Studies, I. 75 (1902).—**Flavae.**—Florida (type locality: River Junction).

abjecta Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 636 (1905).—**Intricatae.**—Pennsylvania (type locality: Sellersville).

aboriginum Sargent in Rhodora, v. 163 (1903) = C. rotundifolia var. aboriginum Sarg.

abstrusa Beadle in Biltmore Bot. Studies, I. 66 (1902).—**Pulcherrimae.**—Florida (type locality: Tallahassee).

accincta Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 154 (1910).—**Crus-galli.**—Pennsylvania (type locality: McKees Rocks).

CRATAEGUS

acclivis Sargent in Proc. Rochester Acad. Sci. IV. 115 (1903).—**Coccineae.**—New York, Pennsylvania (type locality: Rochester, N. Y.).

acerba Sargent in N. Y. State Mus. Bull. CXXII. 93 (1908).—**Silvicolae.**—New York (type locality: Coopers Plains).

acerifolia Loddiges Cat. 8, ex Moench, Bäume Weiss. 31 (1785) = C. Phaenopyrum Medic.

acuminata Sargent in N. Y. State Mus. Bull. CV. Bot. IX. 56 (1906).—**Tenuifoliae.**—New York, Pennsylvania, Ohio (type locality: West Albany, N. Y.).

acutifolia Sargent in Bot. Gaz. XXXI. 217 (1901).—**Crus-galli.**—Illinois, Missouri, Tennessee, Arkansas (type locality: Carondelet).

acutiloba Sargent in Rhodora, III. 23 (1901).—**Tenuifoliae.**—Southeastern Canada, New England (type locality: Bar Harbor, Me.).

admiranda Sargent in N. Y. State Mus. Bull. CXXII. 80 (1908).—**Macracanthae.**—Ontario, New York (type locality: Niagara Falls, N. Y.).

adunca Beadle in Biltmore Bot. Studies, I. 87 (1902).—**Flavae.**—Florida (type locality: Tallahassee).

adusta Beadle in Biltmore Bot. Studies, I. 110 (1902).—**Flavae.**—Florida (type locality: Gainesville).

advena Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 175 (1910).—**Pruinosae.**—Pennsylvania (type locality: Bedford).

aemula Beadle in Biltmore Bot. Studies, I. 53 (1902).—**Silvicolae.**—Georgia, Mississippi (type locality: Rome, Ga.).

aestivalis (Walt.) Torrey & Gray, Fl. N. Am. I. 468 (1840).—**Aestivales.**—North Carolina, South Carolina, Georgia (type locality of *Mespilus aestivalis* Walter not given).

aestivalis var. cerasoides Sargent in Jour. Arnold Arb. I. 250 (1920).—Florida (type locality: Seville).

aestivalis var. cerasoides f. luculenta Sargent in Jour. Arnold Arb. I. 251 (1920).—Florida (type locality: Volusia County).

aestivalis var. maloides Sargent in Jour. Arnold Arb. I. 250 (1920).—Florida (type locality: Seville).

affinis Sargent in Ontario Nat. Sci. Bull. IV. 71 (1908).—**Anomalae.**—Southeastern Canada, New York (type locality: Toronto, Ont.).

agaia Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 252 (1910).—**Macracanthae.**—Pennsylvania (type locality: Scranton).

agrestina Beadle in Biltmore Bot. Studies, I. 72 (1902).—**Flavae.**—Alabama (type locality: Evergreen).

alabamensis Beadle in Bot. Gaz. XXX. 342 (1900).—**Flavae.**—Alabama (type locality: Montgomery).

alacris Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 601 (1905).—**Pruinosae.**—Pennsylvania (type locality: Sellersville).

albanthera Sargent in Rep. Missouri Bot. Gard. XIX. 53 (1908) = C. arduennae Sarg.

CRATAEGUS

albemarlensis Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. pt. 2, 10 (1901).—Group?—North Carolina (type locality: "Hyde and Pamlico Counties"). (?)

albicans Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. pt. 2, 20 (1901).—**Silvicolae.**—Michigan (type locality: "eastern Michigan"). (?)

albicera Beadle in Biltmore Bot. Studies, I. 132 (1902).—**Crus-galli.**—Louisiana (type locality: Opelousas).

algens Beadle in Biltmore Bot. Studies, I. 135 (1902).—**Crus-galli.**—Virginia and North Carolina to Tennessee and Arkansas (type locality: Biltmore, N. Car.).

aliena Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 157 (1910).—**Crus-galli.**—Pennsylvania (type locality: Orbisonia).

allecta Sargent in Rep. Geol. Surv. Mich. 1906, 534 (1907).—**Silvicolae.**—Michigan (type locality: Grand Rapids).

alleghaniensis Beadle in Bot. Gaz. XXX. 337 (1900).—**Flavae.**—Alabama, Tennessee (type locality: Lookout Mountain, Ala.).

alma Beadle in Biltmore Bot. Studies, I. 64 (1902).—**Intricatae.**—Mississippi (type locality: Meridian).

alnorum Sargent in Rhodora, V. 153 (1903).—**Tenuifoliae.**—Maine (type locality: Orono).

alpestris Hort. ex K. Koch, Dendr. I. 144 (1869) = C. crus-galli var. pyracanthifolia Ait.

alpista Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 238 (1910).—**Intricatae.**—Pennsylvania (type locality: Orbisonia).

altrix Ashe in Bot. Gaz. XXXIII. 232 (1902).—Group?—Illinois (type locality: "northern Illinois"). (?)

amabilis Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 15 (1903).—**Molles.**—Iowa (type locality: Keokuk). (?)

amara Ashe in Jour. Elisha Mitchell Sci. Soc. XVIII. 22 (1902).—Group?—North Carolina (type locality: Elk Cross Roads). (?)

ambigens Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 191 (1910).—**Silvicolae.**—Pennsylvania (type locality: Kittanning).

ambitiosa Sargent, Trees and Shrubs, II. 240 (1913).—**Pruinosae.**—Michigan (type locality: Grand Rapids).

ambrosia Sargent in N. Y. State Mus. Bull. CV. Bot. IX. 69 (1906).—**Macracanthae.**—Ontario, New York (type locality: Albany, N. Y.).

amica Beadle in Biltmore Bot. Studies, I. 97 (1902).—**Flavae.**—Florida (type locality: Ocala).

amicalis Sargent, Trees and Shrubs, II. 238 (1913).—**Virides.**—Arkansas (type locality: Fulton).

amicta Ashe in Jour. Elisha Mitchell Sci. Soc. XVIII. 26 (1902).—**Coccineae.**—Illinois (type locality: "northern Illinois").

amnicola Beadle in Biltmore Bot. Studies, I. 55 (1902).—**Punctatae.**—Georgia, Alabama, Tennessee (type locality: Chattanooga, Tenn.).

CRATAEGUS

amoena Sargent in N. Y. State Mus. Bull. CXXII. 38 (1908).—**Pruinosae.**—New York, Ohio (type locality: Niagara Falls, N. Y.).

ampla Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 615 (September, 1905).—**Tenuifoliae.**—Pennsylvania (type locality: Kutztown).

ampla Sargent in Rhodora, VII. 208 (November, 1905) = C. neofaxonii Sarg.

ampliata Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 195 (1910).—**Silvicolae.**—Pennsylvania (type locality: Orbisonia).

amplifica Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 172 (1910).—**Pruinosae.**—Pennsylvania (type locality: Pittsburgh).

anamesa Sargent in Jour. Arnold Arb. III. 189 (1922).—**Virides.**—Texas (type locality: Duke, Ft. Bend County).

ancisa Beadle in Biltmore Bot. Studies, I. 63 (1902).—**Pulcherrimae.**—Alabama, Mississippi (type locality, Meridian, Miss.).

angulata Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 166 (1910).—**Pruinosae.**—Pennsylvania, Ohio, Kentucky (type locality: Nine Mile Run, near Pittsburgh, Pa.).

angustata Sargent in Rep. Missouri Bot. Gard. XIX. 77 (1908).—**Punctatae.**—Missouri (type locality: Swan).

angustifolia (Medic.) Borkhausen in Roemer, Arch. Bot. I. no. 3, 86 (1798) = C. crus-galli var. pyracanthifolia Ait.

angustisepala Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 209 (1910).—**Tenuifoliae.**—Pennsylvania (type locality: Throop, near Scranton).

anisophylla Beadle in Biltmore Bot. Studies, I. 99 (1902).—**Flavae.**—Florida (type locality: Jacksonville).

annosa Beadle in Biltmore Bot. Studies, I. 83 (1902).—**Flavae.**—Alabama (type locality: Phoenix City).

anomala Sargent in Rhodora, III. 74 (1901).—**Molles.**—Southeastern Canada, Vermont, New York (type locality: Caughnawaga, Que.).

antheina Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 213 (1910).—**Tenuifoliae.**—Pennsylvania (type locality: West Lockport).

antimima Sargent in Jour. Arnold Arb. III. 191 (1922).—**Virides.**—Texas, Oklahoma (type locality: Duke, Tex.).

antiplasta Sargent in Jour. Arnold Arb. III. 190 (1922).—**Virides.**—Texas (type locality: Duke).

aperta Sargent in Rep. Missouri Bot. Gard. XIX. 96 (1908).—**Pruinosae.**—Missouri (type locality: Swan).

apiifolia (Marsh.) Michaux, Fl. Bor. Am. I. 287 (1803).—**Microcarpae.**—Virginia to Florida and west to eastern Texas (type region: "Carolina").

apiifolia var. *flavanthera* Sargent in Rep. Missouri Bot. Gard. XX. 82 (1912) = C. spathulata Michx.

apiifolia major Loddiges, Cat. 45 (1836), nomen nudum.—Loudon, Arb. Brit. II. 824 (1838), as synonym of C. apiifolia Michx.

CRATAEGUS

apiifolia var. *minor* Loudon, Arb. Brit. II. 825 (1838) = C. apiifolia Michx.

apiifolia × brachyphylla = C. notha.

apiomorpha Sargent in Bot. Gaz. XXXV. 386 (1903).—**Tenuifoliae.**—Ohio, Illinois (type locality: Fort Sheridan, Ill.).

apposita Sargent in Bot. Gaz. XXXV. 103 (1903).—**Intricatae.**—Pennsylvania, Delaware (type locality: Wilmington, Del.).

apposita var. *Bissellii* (Sarg.) Eggleston in Rhodora, X. 76 (1908) = C. Bissellii.

aprica Beadle in Bot. Gaz. XXX. 335 (1900).—**Flavae.**—North Carolina, Georgia, Alabama (type locality: Biltmore, N. Car.).

aquilonaris Sargent in Rhodora, V. 185 (1903).—**Macracanthae.**—Southeastern Canada (type locality: Nipissing, Ont.).

araioclada Sargent in Jour. Arnold Arb. III. 5 (1922).—**Crus-galli.**—Louisiana (type locality: Natchitoches).

arborea Beadle in Biltmore Bot. Studies, I. 137 (1902).—**Crus-galli.**—Florida, Alabama (type locality: Montgomery, Ala.).

arborescens Elliot, Sketch Bot. I. 550 (1821).—**Virides.**—Georgia, Florida (type locality: Fort Argyle, on Ogeeche River, Ga.).

arcana Beadle in Biltmore Bot. Studies, I. 122 (1902).—**Pruinosae.**—New York to North Carolina, west to Michigan and Missouri (type locality: Biltmore, N. Car.).

arcuata Ashe in Ann. Carnegie Mus. I. 387 (1902).—**Coccineae.**—Pennsylvania, Delaware (type locality: Kutztown, Pa.).

ardua Sargent in Ontario Nat. Sci. Bull. IV. 93 (1908).—**Macracanthae.**—Ontario (type locality: Toronto).

arduennae Sargent in Bot. Gaz. XXXV. 377 (1903).—**Crus-galli.**—Ontario and New York, west to Michigan, Missouri and Arkansas (type locality: Glenellyn, Ill.).

arenicola Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. 5 (1900).—**Uniflorae.**—North Carolina (type locality: Jessup). (?)

arguta Beadle in Biltmore Bot. Studies, I. 102 (1902).—**Flavae.**—Georgia, Alabama (type locality: Girard, Ala.).

aridula Sargent in N. Y. State Mus. Bull. CXXII. 43 (1908).—**Pruinosae.**—New York (type locality: Niagara Falls).

aristata Sargent in N. Y. State Mus. Bull. CL. 27 (1911).—**Pruinosae.**—New York (type locality: Rossie).

arkansana Sargent in Bot. Gaz. XXXI. 223 (1901).—**Molles.**—Arkansas (type locality: cultivated in Arnold Arboretum from seed collected at Newport, Ark.).

armata Beadle in Biltmore Bot. Studies, I. 136 (1902).—**Crus-galli.**—Alabama, Tennessee (type locality: Nashville, Tenn.).

armentalis Beadle in Biltmore Bot. Studies, I. 117 (1902).—**Uniflorae.**—Alabama (type locality: Albertsville).

CRATAEGUS

armigera Sargent in Ontario Nat. Sci. Bull. IV. 87 (1908).—**Macracanthae.**—Southeastern Canada (type locality: Toronto, Ont.).

arnoldiana Sargent in Bot. Gaz. XXXI. 221 (1901).—**Molles.**—Massachusetts, Connecticut, New York (type locality: Arnold Arboretum, cultivated).

arrogans Beadle in Biltmore Bot. Studies, I. 81 (1902).—**Flavae.**—Georgia, Alabama (type locality: Phoenix City, Ala.).

arta Beadle in Biltmore Bot. Studies, I. 130 (1902).—**Crus-galli.**—Tennessee (type locality: Nashville).

ascendens Sargent in Rhodora, V. 141 (1903).—**Tenuifoliae.**—Vermont, New York (type locality: New Haven, Vt.).

Ashei Beadle in Bot. Gaz. XXX. 339 (1900).—**Bracteatae.**—Alabama, Mississippi (type locality: Montgomery County, Ala.).

aspera Sargent, Trees and Shrubs, II. 67 (1908).—**Pruinosae.**—Missouri (type locality: Webb City).

asperata Sargent in Rep. Geol. Surv. Mich. 1906, 542 (1907).—**Tenuifoliae.**—Michigan (type locality: Port Huron).

asperifolia Sargent in Rhodora, III. 31 (1901).—**Anomalae.**—Southeastern Canada, New England, New York (type locality: Middlebury, Vt.).

assimilis Beadle in Biltmore Bot. Studies, I. 68 (1902).—**Pulcherrimae.**—Florida (type locality: Chattahoochee).

assurgens Sargent in Bot. Gaz. XXXV. 382 (1903).—**Coccineae.**—Ohio, Illinois, Wisconsin (type locality: Glendon Park, near Chicago, Ill.).

ater Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 21 (1903).—**Pruinosae.**—Michigan, Ohio (type locality: Port Huron, Mich.).

atropurpurea Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. pt. 2, 12 (1901) =C. velata Ashe.

atrorubens Ashe in Jour. Elisha Mitchell Sci. Soc. XVI. 78 (1900).—**Virides.**—Illinois, Missouri (type locality: St. Louis County, Mo.).

attenuata Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 30 (1903).—**Crus-galli.**—Michigan, Illinois (type locality: Port Huron, Mich.).

attrita Beadle in Biltmore Bot. Studies, I. 98 (1902).—**Flavae.**—Alabama (type locality: Ozark).

audens Beadle in Biltmore Bot. Studies, I. 114 (1902).—**Flavae.**—Florida (type locality: Chattahoochee).

augusta Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 597 (1905).—**Pruinosae.**—Pennsylvania (type locality: Kutztown).

aulica Sargent in Ontario Nat. Sci. Bull. IV. 48 (1908).—**Coccineae.**—Ontario, New York, Michigan (type locality: Toronto, Ont.).

aurea Hort. ex Nicholson in Hand-list Arb. Kew. pt. 1, 209 (1894) as a synonym of *C. punctata* var. *xanthocarpa* =C. punctata var. aurea Ait.

CRATAEGUS

austera Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 586 (1905).—**Pruinosae.**—Pennsylvania (type locality: Sellersville).

austrina Beadle in Biltmore Bot. Studies, I. 59 (1902).—**Pulcherrimae.**—Alabama (type locality: Greenville).

austromontana Beadle in Bot. Gaz. XXVIII. 412 (1899).—**Triflorae.**—Georgia, Alabama, Tennessee (type locality: Valley Head, Ala.).

axillaris (Pers.) Loddiges, Cat. 39 (1826).—Loudon, Arb. Brit. II. 841 (1838) as synonym of *C. parvifolia* Ait.

baccata Sargent in Rhodora, VII. 176 (1905).—**Macracanthae.**—Massachusetts (type locality: Lancaster).

Balkwillii Sargent in Ontario Nat. Sci. Bull. IV. 80 (1908).—**Macracanthae.**—Ontario, New York (type locality: London, Ont.).

barbara Sargent in N. Y. State Mus. Bull. CXXII. 33 (1908).—**Punctatae.**—New York (type locality: Brighton).

barbata Sargent in Rep. Missouri Bot. Gard. XIX. 63 (1908).—**Crus-galli.**—Missouri (type locality: Swan).

Baroussana Eggleston in Torreya, VII. 35 (1907).—**Molles.**—Mexico (type locality: Saltillo, Coahuila).

barrettiana Sargent in Rep. Missouri Bot. Gard. XIX. 50 (1908).—**Crus-galli.**—Ohio, Indiana, Illinois, Missouri (type locality: Barretts Station, Mo.).

Barryana Sargent in N. Y. State Mus. Bull. CXXII. 52 (1908).—**Silvicolae.**—New York (type locality: Rochester).

Bartoniana Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 637 (1905).—**Intricatae.**—Pennsylvania (type locality: Gray's Ferry).

Bartramiana Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 582 (1905).—**Crus-galli.**—Pennsylvania (type locality: Bartram's Lane, Philadelphia).

basilica Beadle in Biltmore Bot. Studies, I. 125 (1902).—**Tenuifoliae.**—North Carolina, South Carolina (type locality: Candler, N. Car.).

Baxteri Sargent in Proc. Rochester Acad. Sci. IV. 107 (1903) = C. foetida Ashe.

Beadlei Ashe in Bull. N. Car. Exper. Sta. CLXXV. 113 (1900).—**Intricatae.**—North Carolina (type locality: Salisbury). (?)

Bealii Sargent in Rep. Geol. Surv. Mich. 1906, 553 (1907).—**Intricatae.**—Michigan (type locality: Grand Rapids).

beata Sargent in Proc. Rochester Acad. Sci. IV. 97 (1903).—**Pruinosae.**—New York, Pennsylvania (type locality: Rochester, N. Y.).

beata var. *compta* (Sarg.) Eggleston in Rhodora, X. 81 (1908) = C. compta.

Beckiana Sargent in N. Y. State Mus. Bull. CV. 75 (1906).—**Macracanthae.**—New York (type locality: North Greenbush).

Beckwithae Sargent in Proc. Rochester Acad. Sci. IV. 124 (1903) = C. diffusa Sarg.

CRATAEGUS

bedfordensis Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 185 (1910).—**Pruinosae.**—Pennsylvania, Ohio (type locality: Bedford Springs, Pa.).

bella Sargent in N. Y. State Mus. Bull. CXXII. 61 (1908).—**Tenuifoliae.**—Ontario, New York, Pennsylvania, Ohio (type locality: Buffalo, N. Y.).

bellatula Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 171 (1910).—**Pruinosae.**—Pennsylvania (type locality: Bedford).

bellica Sargent, Trees and Shrubs, II. 236 (1913).—**Crus-galli.**—Arkansas, Oklahoma, Texas (type locality: Fulton, Ark.).

bellula Sargent, Trees and Shrubs I. 111 (1903).—**Pruinosae.**—Massachusetts, Michigan (type locality: Grand Rapids, Mich.).

benigna Sargent in Proc. Rochester Acad. Sci. IV. 127 (1903).—**Tenuifoliae.**—New York (type locality: Rochester).

berberifolia Torrey & Gray, Fl. N. Am. I. 469 (1840).—**Crus-galli.**—Louisiana (type locality: Opelousas).

berberifolia var. *Engelmanni* (Sarg.) Eggleston in Rhodora, X. 76 (1908) = C. Engelmannii Sarg.

Berlandieri Sargent in Bot. Gaz. XXXI. 230 (1901).—**Molles.**—Texas (type locality: Columbia).

betulifolia Loddiges, Cat. 45 (1836).—Loudon, Arb. Brit. II. 841 (1838) as a synonym of *C. parvifolia* Ait.—Nomen nudum.

Bicknellii Eggleston in Bull. Torrey Bot. Club XXXVIII. 244 (1911).—**Rotundifoliae.**—Massachusetts (type locality: Nantucket Island).

bicolor Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. pt. 2, 12 (1901).—Group?—North Carolina (type locality: Mitchell County). (?)

biltmoreana Beadle in Bot. Gaz. XXVIII. 406 (1899).—**Intricatae.**—Pennsylvania and Virginia to South Carolina, Alabama and Tennessee (type locality: Biltmore, N. Car.).

Bissellii Sargent in Rhodora, V. 65 (1903).—**Intricatae.**—Connecticut, New York (type locality: Southington, Ct.).

bisulcata Ashe in Bull. N. Car. Exper. Sta. CLXXV. 112 (1900).—**Uniflorae.**—Georgia (type locality: Stone Mountain).

blairensis Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 193 (1910).—**Silvicolae.**—Pennsylvania, Ohio (type locality: Altoona, Pa.).

Blanchardii Sargent in Rhodora, VII. 218 (1905).—**Rotundifoliae.**—Ontario, Vermont (type locality: Wilmington, Vt.).

blanda Sargent in Bot. Gaz. XXXIII. 121 (1902).—**Virides.**—Alabama, Louisiana, Arkansas, Texas (type locality: Fulton, Ark.).

blandita Sargent in Rhodora, V. 147 (1903).—**Tenuifoliae.**—Quebec (type locality: Caughnawaga).

bona Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 587 (1905).—**Pruinosae.**—Pennsylvania (type locality: Berks County).

CRATAEGUS

Boothiana Sargent in N. Y. State Mus. Bull. CXXII. 58 (1908).—**Tenuifoliae.**—New York (type locality: Rochester).

borealis Ashe in Bull. N. Car. Exper. Sta. CLXXV. 111 (1900).—Group?—Michigan (type locality not given). (?)

Bosciana Roemer, Fam. Nat. Syn. III. 119 (1847) = C. crus-gallii L.

Boyntonii Beadle in Bot. Gaz. XXVIII. 409 (1899).—**Intricatae.**—Virginia, North Carolina, Georgia, Alabama, Tennessee (type locality: Biltmore, N. Car.).

Boyntoni var. *Buckleyi* (Beadle) Ashe in Jour. Elisha Mitchell Sci. Soc. XXXIV. 139 (1918) = C. Buckleyi.

brachyacantha Sargent & Engelmann apud Engelmann in Bot. Gaz. VII. 128 (1882).—**Brachyacanthae.**—Arkansas, Louisiana, Texas (type locality not given).

brachyacantha f. leucocarpa Sargent in Jour. Arnold Arb. III. 10 (1922).—Louisiana (type locality: Natchitoches).

brachyacantha var. maxima Kuntze, Rev. Gen. Pl. I. 215 (1891).—Mississippi (type locality: Cairo). (?)

brachyloba Sargent in N. Y. State Mus. Bull. CXXII. 75 (1908).—**Anomalae.**—New York (type locality: Buffalo).

brachyphylla Sargent in Jour. Arnold Arb. III. 8 (1922).—**Molles.**—Arkansas (type locality: McNab, Hempstead County).

brachyphylla × apiifolia = C. notha.

brachypoda Sargent in Rep. Missouri Bot. Gard. XIX. 100 (1908).—**Pruinosae.**—Kentucky, Missouri (type locality: Grandin, Mo.).

bracteata Sargent in Rep. Missouri Bot. Gard. XIX. 91 (1908).—**Pruinosae.**—Missouri, Arkansas, Oklahoma (type locality: Webb City, Mo.).

Brainerdii Sargent in Rhodora, III. 27 (1901).—**Rotundifoliae.**—Southeastern Canada, Vermont (type locality: Middlebury, Vt.).

Brainerdi var. *asperifolia* (Sarg.) Eggleston in Rhodora, X. 82 (1908) = C. asperifolia.

Brainerdi var. *Egglestoni* (Sarg.) Robinson in Rhodora, X. 82 (1908) = C. Egglestonii.

Brainerdi var. *scabrida* (Sarg.) Eggleston in Rhodora, X. 82 (1908) = C. scabrida.

brazoria Sargent in Bot. Gaz. XXXI. 233 (1901).—**Punctatae.**—Texas (type locality: Brazoria).

brevipedicellata Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. 6 (1900).—Group?—North Carolina (type locality: Priest Hill). (?)

brevipes Peck in N. Y. State Mus. Bull. CXXXIX. 20 (1910).—**Pruinosae.**—New York (type locality: Corning).

brevispina Douglas apud Steudel, Nomencl. Bot. ed. 2, I. 432 (1841) = C. Douglasii Lindl.

CRATAEGUS

bristolensis Sargent in Rhodora, VII. 175 (1905).—**Macracanthae.**—Massachusetts (type locality: Somerset).

Brittonii Eggleston in Bull. Torrey Bot. Club, XXXVI. 640 (1909).—**Uniflorae.**—North Carolina, Georgia, Tennessee (type locality: Biltmore, N. Car.).

Brockwayae Sargent, Trees and Shrubs, II. 245 (1913).—**Anomalae.**—Michigan (type locality: Clifton).

bronxensis Sargent in N. Y. State Mus. Bull. CXXII. 115 (1908).—**Pruinosae.**—New York (type locality: New York Botanical Garden).

Brownietta Sargent in N. Y. State Mus. Bull. CLXVII. 78 (1913).—**Punctatae.**—New York (type locality: Hemlock Lake, Livingston County).

Brownii Britton in Bull. N. Y. Bot. Gard. I. 447 (1900) = C. Margaretta var. Brownii Sarg.

brumalis Ashe in Ann. Carnegie Mus. I. 393 (1902).—**Tenuifoliae.**—Pennsylvania (type locality: Pittsburgh).

Brunetiana Sargent in Rhodora, V. 164 (1903).—**Rotundifoliae.**—Southeastern Canada (type locality: Montmorency Falls, Que.).

Buckleyi Beadle in Biltmore Bot. Studies, I. 25 (1901).—**Intricatae.**—Virginia, North Carolina, Tennessee (type locality: Biltmore, N. Car.).

Buistii Hort. ex K. Koch, Dendr. I. 144 (1869) = C. crus-galli var. pyracanthifolia Ait.?

Burkeana Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 218 (1910).—**Coccineae.**—Pennsylvania (type locality: Pittsburgh).

Bushii Sargent in Bot. Gaz. XXXIII. 109 (1902).—**Crus-galli.**—Arkansas, Louisiana, Oklahoma, Texas (type locality: Fulton, Ark.).

caerulescens Sargent in Jour. Arnold Arb. III. 193 (1922).—**Pruinosae.**—Massachusetts (type locality: Arnold Arboretum, transplanted from Orient Heights, Breed's Island, Boston Harbor).

caesa Ashe in Jour. Elisha Mitchell Sci. Soc. XVIII. 24 (1902).—**Coccineae.**—Michigan (type locality: Port Huron).

caesariata Sargent in N. Y. State Mus. Bull. CV. Bot. IX. 64 (1906).—**Rotundifoliae.**—New York (type locality: North Albany).

calcarigera Salisbury, Prodr. 357 (1796) = C. crus-galli L.

caliciglabra Schuette in Proc. Biol. Soc. Washington, XVI. 96 (1903).—**Rotundifoliae.**—Wisconsin (type locality not given).

calliantha Sargent in Rep. Missouri Bot. Gard. XIX. 93 (1908).—**Pruinosae.**—Missouri (type locality: Pacific).

callicarpa Sargent in Rep. Missouri Bot. Gard. XIX. 96 (1908).—Pruinosae?—Missouri (type locality: Shrewsbury).

callida Beadle in Biltmore Bot. Studies, I. 123 (1902).—**Pruinosae.**—Alabama (type locality: Gadsden).

CRATAEGUS

callista Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 237 (1910).—**Intricatae.**—Pennsylvania (type locality: Sellersville).

callosa Sargent in Acad. Nat. Sci. Phila. LVII. 595 (1905).—**Pruinosae.**—Pennsylvania (type locality: North Heidelburg Township, Berks County).

calophylla Sargent in Rep. Missouri Bot. Gard. XXII. 67 (1912).—**Crus-galli.**—Tennessee, Missouri, Arkansas (type locality: Springfield, Mo.).

calpodendron (Ehrh.) Medicus, Gesch. Bot. 83 (1793).—**Macracanthae.**—Identity and range uncertain (type region of *Mespilus calpodendron* Ehrhart: "Nordamerika").

calpodendron × punctata Eggleston in N. Y. State Mus. Bull. CCXLIII–IV. 65 (1923). (?)

calva Beadle in Biltmore Bot. Studies, I. 83 (1902).—**Flavae.**—Alabama (type locality: Ozark).

calvescens Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 159 (1910).—**Punctatae.**—Pennsylvania (type locality: Allegheny).

Calvinii Sargent in N. Y. State Mus. Bull. CXXII. 81 (1908).—**Macracanthae.**—New York (type locality: Canandagua).

campestris Britton in Bull. N. Y. Bot. Gard. I. 449 (1900) = C. pertomentosa Ashe.

canadensis Sargent in Rhodora, III. 73 (1901).—**Molles.**—Quebec (type locality: Caughnawaga).

Canbyi Sargent in Bot. Gaz. XXXI. 3 (1901).—**Crus-galli.**—Pennsylvania, Delaware, Maryland (type locality: Wilmington, Del.).

candens Sargent in Rep. Missouri Bot. Gard. XIX. 55 (1908) = C. arduennae Sarg.

carnosa Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. pt. 2, 14 (1901).—Group?—North Carolina (type locality: Yancy County). (?)

caroliniana (Poir.) Persoon, Syn. II. 36 (1806).—**Flavae.**—(Type region: "Carolina"). (?)

carrollensis Sargent in Jour. Arnold Arb. III. 204 (1922).—**Macracanthae.**—Arkansas (type locality: Eureka Springs).

casta Sargent in N. Y. State Mus. Bull. CV. Bot. IX. 53 (1906).—**Pruinosae.**—New York (type locality: North Greenbush).

catawbiensis Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. 6 (1900).—Group?—North Carolina (type locality: Round Knob). (?)

celsa Sargent in N. Y. State Mus. Bull. CXXII. 31 (1908).—**Punctatae.**—New York (type locality: Niagara Falls).

cerasifera Loddiges, Cat. 45 (1836), nomen nudum.—Loudon, Arb. Brit. II. 849 (1838), as a synonym of C. crus-galli var. splendens Ait.

cerasina Sargent in N. Y. State Mus. Bull. CXXII. 29 (1908).—**Crus-galli.**—New York (type locality: Niagara Falls).

cerasoides Sargent, Trees and Shrubs, II. 237 (1913) = C. aestivalis

CRATAEGUS

var. cerasoides Sarg.

cernua Ashe in Jour. Elisha Mitchell Sci. Soc. XVIII. 25 (1902).—**Rotundifoliae.**—Wisconsin (type locality: Milwaukee). (?).

cerronis Nelson in Bot. Gaz. XXXIV. 370 (1902).—**Douglasianae.**—Colorado, Wyoming (type locality: Cerro Summit, Colo.). (?)

cestrica Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 596.—**Pruinosae.**—Pennsylvania (type locality: Newtown).

chadfordiana Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 660 (1905).—**Macracanthae.**—Pennsylvania (type locality: Chadford).

champlainensis Sargent in Rhodora, III. 20 (1901).—**Molles.**—Southeastern Canada, Vermont, New York, Michigan (type locality: Middlebury, Vt.).

Chapmanii (Beadle) Ashe in Bot. Gaz. XXVIII. 271 (1899).—**Macracanthae.**—North Carolina and Georgia, west to Illinois and Missouri (type locality of *C. tomentosa* var. *Chapmani:* Silver Creek, Floyd County, Ga.).

Chapmani var. *Plukenetii* Eggleston in Rhodora, X. 83 (1908) = C. tomentosa L.

chateaugayensis Sargent in N. Y. State Mus. Bull. CXXII. 121 (1908).—**Rotundifoliae.**—New York (type locality: Chateaugay Lake).

cherokeensis Sargent in Jour. Arnold Arb. III. 1 (1922).—**Crus-galli.**—Texas (type locality: Larissa).

chippewaensis Sargent in Ontario Nat. Sci. Bull. IV. 44 (1908).—**Coccineae.**—Ontario (type locality: Chippewa).

choriophylla Sargent in Jour. Arnold Arb. III. 201 (1922).—**Uniflorae.**—Florida (type locality: Lake City).

chrysocarpa Ashe in Bull. N. Car. Exper. Sta. CLXXV. 110 (1900).—**Rotundifoliae.**—Manitoba, Nebraska, North Dakota, Wyoming, Colorado (type locality: foothills of Cache la Poudre Mountains, Colo.).

chrysocarpa var. *Faxoni* (Sarg.) Eggleston in N. Y. State Mus. Bull. CCXLIII–IV. 64 (1923) = C. Faxonii.

chrysocarapa × macrosperma Eggleston in N. Y. State Mus. Bull. CCXLII-IV. 64 (1923). (?)

chrysocarpa × punctata Eggleston in N. Y. State Mus. Bull. CCXLIII–IV. 64 (1923). (?)

cibaria Beadle in Biltmore Bot. Studies, I. 120 (1902).—**Molles.**—Tennessee (type locality: Nashville).

cibilis Ashe in Bot. Gaz. XXXIII. 232 (1902).—**Molles.**—North Carolina, Tennessee (type locality not given). (?)

cicur Ashe in Ann. Carnegie Mus. I. 397 (1902).—**Pruinosae.**—Pennsylvania, North Carolina (type locality not given). (?)

ciliata Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. 13 (1900).—Group?—North Carolina (type locality: Raleigh). (?)

CRATAEGUS

cirrata Beadle in Biltmore Bot. Studies, I. 101 (1902).—**Flavae.**—Alabama (type locality: Girard).

cirrata Ashe in Bull. Charleston Mus. XII. 42 (1916). Group?—Georgia (type locality not given). (?)

clara Beadle in Biltmore Bot. Studies, I. 95 (1902).—**Flavae.**—Florida (type locality: Bristol).

Claytoniana Sargent in N. Y. State Mus. Bull. CXXII. 120 (1908).—**Tenuifoliae.**—New York (type locality: Clayton).

Clintoniana Sargent in N. Y. State Mus. Bull. CXXII. 39 (1908).—**Pruinosae.**—New York, Ohio (type locality: Buffalo, N. Y.).

coccinata Sargent in Ontario Nat. Sci. Bull. IV. 63 (1908).—**Rotundifoliae.**—Ontario (type locality: London).

coccinea Linnaeus, Spec. 476 (1753), in part = C. rotundifolia Moench.

coccinea var. *corallina* (Lodd.) Loudon, Arb. Brit. II. 817 (1838) = C. Phaenopyrum Medic.

coccinea var. *cordata* Lavallée, Icon. Arb. Segrez. 81, t. 23 (1882). (?)

coccinea var. *Ellwangeriana* (Sarg.) Eggleston in N. Y. State Mus. Bull. CCXLIII–IV. 64 (1923) = C. Ellwangeriana.

coccinea a. *flabellata* (Bosc) Dippel, Handb. Laubholzk. III. 435 (1893) = C. flabellata.

coccinea glandulosa Hort. ex Nicholson in Hand-list Hort. Kew. pt. I. 203 (1894), as a synonym of C. mollis Scheele.

coccinea var. *indentata* (Lodd.) Loudon, Arb. Brit. II. 817 (1838). (?)

coccinea Kelmanni Hort. ex Nicholson in Hand-list Arb. Kew. pt. I. 203 1894) as a synonym of C. mollis Scheele. (?)

coccinea γ. *Kihlmanni* Hort. apud Lange, Rev. Gen. Crat. 30 (1897). (?)

coccinea var. *macracantha* (Lodd.) Dudley in Bull. Cornell University II. 33 (1886) = C. macracantha.

coccinea maxima Loddiges, Cat. 39 (1826).—Loudon, Arb. Brit. II. 817 (1838). (?)

coccinea ε. *microphylla* Lange, Rev. Gen. Crat. 30 (1897). (?)

coccinea ε ? *mollis* Torrey & Gray, Fl. N. Am. I. 465 (1840) = C. mollis.

coccinea δ. *oligandra* Torrey & Gray, Fl. N. Am. I. 465 (1840). (?)

coccinea γ. *populifolia* (Walt.) Torrey & Gray, Fl. N. Am. I. 465 (1840). (?)

coccinea d. *pruinosa* (Wendl.) Dippel, Handb. Laubholzk. III. 435 (1893) = C. pruinosa.

coccinea var. *rotundifolia* (Moench) Sargent in Bot. Gaz. XXXI. 14 (1901) = C. rotundifolia.

coccinea var. *spinosa* Godefroy ex Loudon, Arb. Brit. II. 817 (1838) as synonym of *C. coccinea* var. *maxima* Lodd.

coccinea * *subvillosa* (Schrad.) Lange, Rev. Gen. Crat. 31 (1897) = C. submollis Sarg.

CRATAEGUS

coccinea β. viridis (L.) Torrey & Gray, Fl. N. Am. I. 465 (1840) = C. viridis.

coccinea × *macrosperma* Eggleston in N. Y. State Mus. Bull. CCXLIII–IV. 65 (1923). (?)

coccinea × *pruinosa* Eggleston in N. Y. State Mus. Bull. CCXLIII–IV. 65 (1923). (?)

coccinoides Ashe in Jour. Elisha Mitchell Sci. Soc. XVI. 74 (1900).—**Dilatatae.**—Illinois, Missouri, Arkansas (type region: southern Illinois and eastern Missouri).

coccinoides var. *dilatata* (Sarg.) Eggleston in Rhodora, X. 81 (1908) = C. dilatata.

Cocksii Sargent in Jour. Arnold Arb. I. 248 (1920).—**Crus-galli.**—Louisiana (type locality: Winfield).

coerulea Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 207 (1910).—**Silvicolae.**—Pennsylvania (type locality: Lincoln Heights, near Scranton).

cognata Sargent in Rhodora, V. 58 (1903).—**Pruinosae.**—Southeastern Canada, New England, New York, Pennsylvania and Ohio (type locality: Great Barrington, Mass.).

Coleae Sargent, Trees and Shrubs, I. 7 (1902).—**Anomalae.**—Michigan (type locality: Grand Rapids).

collicola Ashe in Jour. Elisha Mitchell Sci. Soc. XVI. 75 (1900).—**Crus-galli.**—North Carolina (type locality not given). (?)

collina Chapman, Fl. ed. 2, Suppl. 2, 684 (1892).—**Punctatae.**—Virginia and North Carolina to Tennessee (type locality not given).

collina var. *Lettermani* (Sarg.) Eggleston in Rhodora, X. 76 (1908) = C. Lettermanii.

collina var. *sordida* (Sarg.) Eggleston in Rhodora, X. 76 (1908) = C. sordida.

Collinsiana Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 611 (1905).—**Tenuifoliae.**—Pennsylvania (type locality: Sellersville).

colonica Beadle in Biltmore Bot. Studies, I. 104 (1902).—**Flavae.**—South Carolina (type locality: Bluffton).

coloradensis Nelson in Proc. Biol. Soc. Washington, XVII. 175 (1904).—**Macracanthae.**—Colorado (type locality: Gregory Canyon, near Boulder).

colorado Ashe in Bull. N. Car. Exper. Sta. CLXXV. 110 (1900).—**Douglasianae.**—North Dakota and Montana to Nebraska, Colorado and Arizona (type locality: foot-hills of Cache la Poudre Mountains, Colo.).

coloradoides Ramaley in Bot. Gaz. XLVI. 383 (1908).—**Macracanthae.**—Colorado (type locality: Pole Canyon, near Boulder). (?)

colorata Sargent in Proc. Rochester Acad. Sci. IV. 123 (1903).—**Tenuifoliae.**—Ontario and New York to Michigan and Indiana (type locality: Rochester, N. Y.).

CRATAEGUS

columbiana Howell, Fl. N. W. Am. I. 163 (1898).—**Douglasianae.**—Washington (type locality not given).

columbiana Sargent in Bot. Gaz. XXXI. 229 (1901) = C. quercina Ashe.

columbiana var. *Brunetiana* (Sarg.) Eggleston in Rhodora, x. 79 (1908) = C. Brunetiana.

columbiana var. *Piperi* (Britton) Eggleston in Rhodora, x. 79 (1908) = C. Piperi.

comans Sargent in N. Y. State Mus. Bull. CXXII. 112 (1908).—**Macracanthae.**—New York (type locality: Coopers Plains).

comata Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 592 (1905).—**Pruinosae.**—Pennsylvania (type locality: Gray's Ferry).

communis Beadle in Biltmore Bot. Studies, I. 58 (1902).—**Intricatae.**—West Virginia, Tennessee (type locality: Cowan, Tenn.).

compacta Sargent in Rep. Geol. Surv. Mich. 1906, 522 (1907).—**Punctatae.**—Ontario, Michigan (type locality: London, Ont.).

comparata Sargent, Trees and Shrubs, II. 240 (1913).—**Pruinosae.**—Michigan (type locality: Grand Rapids).

compatalis Ashe in Bull. Charleston Mus. XII. 43 (1916).—Group?—South Carolina (type locality not given). (?)

compitalis Beadle in Biltmore Bot. Studies, I. 93 (1902).—**Flavae.**—Florida (type locality: Gainesville).

compta Sargent in Proc. Rochester Acad. Sci. IV. 102 (1903).—**Silvicolae.**—Ontario, New York, Pennsylvania (type locality: Rochester, N. Y.).

concinna Beadle in Biltmore Bot. Studies, I. 70 (1902).—**Pulcherrimae.**—Florida (type locality: Bristol).

condensa Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 617 (1905).—**Tenuifoliae.**—Pennsylvania (type locality: Sellersville).

condigna Beadle in Biltmore Bot. Studies, I. 35 (1901).—**Flavae.**—Florida (type locality: River Junction).

conferta Sargent in N. Y. State Mus. Bull. CXXII. 62 (1908).—**Tenuifoliae.**—Ontario, New York (type locality: Buffalo, N. Y.).

confinis Sargent in Ontario Nat. Sci. Bull. IV. 50 (1908).—**Coccineae.**—Ontario, New York (type locality: Chippewa, Ont.).

confragosa Sargent in Ontario Nat. Sci. Bull. IV. 24 (1908).—**Pruinosae.**—Ontario, Ohio (type locality: Sarnia, Ont.).

confusa Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 235 (1910).—**Intricatae.**—Pennsylvania (type locality: Allegheny).

congestiflora Sargent in N. Y. State Mus. Bull. CXXII. 44 (1908).—**Silvicolae.**—Quebec, New York (type locality: Buffalo, N. Y.).

conjuncta Sargent in Rhodora, v. 57 (1903).—**Pruinosae.**—New England and New York to Indiana, Illinois and Arkansas (type locality: Lancaster, Mass.).

CRATAEGUS

conjungens Sargent in Jour. Arnold Arb. III. 200 (1922).—**Triflorae.**—Virginia (type locality: Clifton Forge).

consanguinea Beadle in Biltmore Bot. Studies, I. 34 (1901).—**Flavae.**—Florida (type locality: Tallahassee).

conspecta Sargent in Ontario Nat. Sci. Bull. IV. 28 (1908).—**Coccineae.**—Ontario, New York (type locality: Chippewa, Ont.).

conspicua Sargent in N. Y. State Mus. Bull. CV. Bot. IX. 74 (1906).—**Macracanthae.**—Quebec, Vermont, New York. (type locality: North Albany, N. Y.).

constans Beadle in Biltmore Bot. Studies, I. 88 (1902).—**Flavae.**—Mississippi (type locality: Columbus).

consueta Sargent in Rep. Missouri Bot. Gard. XIX. 67 (1908).—**Crus-galli.**—Missouri (type locality: Swan).

contigua Sargent in Rhodora, V. 115 (1903).—**Coccineae.**—Vermont (type locality: Stockbridge).

contortifolia Sargent in N. Y. State Mus. Bull. CV. Bot. IX. 59 (1906).—**Molles.**—New York (type locality: North Albany).

contortula Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 236 (1910).—**Intricatae.**—Pennsylvania (type locality: Bedford).

contrita Beadle in Biltmore Bot. Studies, I. 61 (1902).—**Pulcherrimae.**—Florida, Georgia (type locality: River Junction, Fla.).

corallina Hort. ex Persoon, Syn. II. 36 (1807), as a synonym of *C. cordata* = C. Phaenopyrum Medic.

cornellii Sargent in N. Y. State Mus. Bull. CXXII. 105 (1908).—**Intricatae**—New York (type locality: Coopers Plains).

cornifolia (Poir.) Booth ex Loudon, Arb. Brit. II. 819 (1838), as synonym of *C. pyrifolia* Ait. (?)

coronata Hort. ex Lange, Rev. Gen. Crat. 33 (1897), as synonym of C. intricata Lange.

corporea Sargent in Bot. Gaz. XXXV. 403 (1903).—**Macracanthae.**—Illinois (type locality: Lake Zurich).

corusca Sargent in Bot. Gaz. XXXIII. 117 (1902).—**Molles.**—Illinois (type locality: Lake Zurich).

Coursetiana Roemer, Fam. Nat. Syn. III. 117 (1847) = C. crus-galli L.

crassa Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. pt. 2, 18 (1901).—**Flavae.**—Eastern Pennsylvania (type locality not given). (?)

crassifolia Sargent in Ontario Nat. Sci. Bull. IV. 60 (1908).—**Rotundifoliae.**—Ontario (type locality: London).

Crawfordiana Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 169 (1910).—**Pruinosae.**—Pennsylvania (type locality: Linesville).

Craytonii Beadle in Biltmore Bot. Studies, I. 121 (1902).—**Intricatae.**—North Carolina (type locality: Marshall). (?)

cristata Ashe in Ann. Carnegie Mus. I. 392 (1902).—**Coccineae.**—Pennsylvania, Ohio (type locality: Pittsburgh, Pa.).

CRATAEGUS

crocata Ashe in Ann. Carnegie Mus. I. 389 (1902) = C. punctata var. aurea Ait.

crocea Beadle in Biltmore Bot. Studies, I. 113 (1902).—**Flavae.**—Florida (type locality: Citra).

crocina Beadle in Biltmore Bot. Studies, I. 132 (1902).—**Crus-galli.**—Louisiana (type locality: Opelousas).

Croomiana Sargent in Jour. Arnold Arb. III. 202 (1922).—**Uniflorae.**—Florida (type locality: Tallahassee).

cruda Sargent in N. Y. State Mus. Bull. CXXII. 54 (1908).—**Silvicolae.**—New York (type locality: Niagara Falls).

crudelis Sargent in Rhodora, v. 143 (1903).—**Tenuifoliae.**—Southeastern Canada (type locality: Montmorency Falls, Que.).

cruenta Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. pt. 2, 16 (1901).—Group?—North Carolina (type locality: between Sprucepine and Micaville). (?)

crus-galli Linnaeus, Spec. 476 (1753).—**Crus-galli.**—Southeastern Canada and New England to North Carolina, west to Alabama, Tennessee, Illinois and Missouri (type region: "Virginia").

crus-galli angustifolia (Ehrh.) Sudworth in Bull. U. S. Dept. Agric. Div. For. XIV. 217 (1897) = C. crus-galli var. pyracanthifolia Ait.

crus-galli var. arbutifolia Hort. ex Nicholson in Hand-list Arb. Kew, pt. 1, 197 (1894), nomen nudum. (?)

crus-galli var. *attenuata* (Ashe) Farwell in Rep. Michigan Acad. Sci. XX. 181 (1918) = C. attenuata.

crus-galli var. *berberifolia* (Torr. & Gray) Sargent in Gard. & For. II. 124 (1889) = C. berberifolia.

crus-galli var. capillata Sargent in Bot. Gaz. XXXV. 100 (1903).—Delaware (type locality: Wilmington).

crus-galli var. exigua (Sarg.) Eggleston in Rhodora, X. 75 (1908).—Connecticut (type locality of C. exigua Sarg.: Waterford).

crus-galli var. *Fontanesiana* (Spach) Wenzig in Linnaea, XXXVIII. 141 (1874) = C. Fontanesiana.

crus-galli ζ. inermis Lange, Rev. Gen. Crat. 62 (1897). (?)

crus-galli γ. *lancifolia* (Wend.) Lange, Rev. Gen. Crat. 62 (1897) = C. crus-galli var. pyracanthifolia Ait.

crus-galli β. laurifolia (Medic.) Lange, Rev. Gen. Crat. 61 (1897). (?)

crus-galli δ. *linearis* (Pers.) De Candolle, Prodr. II. 626 (1825) = C. crus-galli var. pyracanthifolia Ait.

crus-galli var. *nana* (Dum.) Loudon, Arb. Brit. II. 821 (1838). = C. crus-galli var. pyracanthifolia Ait.

crus-galli var. oblongata Sargent in Bot. Gaz. XXXV. 99 (1903).—Pennsylvania, Delaware (type locality: Edgemoore, Del.).

crus-galli var. ovalifolia (Hornem.) Lindley, in Bot. Reg. XXII. t. 1860, (1836) = C. prunifolia Pers.

CRATAEGUS

crus-galli prunellifolia (Poir.) Sudworth, Bull. U. S. Dept. Agr. Div. For. XIV. 216 (1897). (?)

crus-galli ε. *prunifolia* (Marsh.) London, Arb. Brit. II. 821, 849 (1838). = C. prunifolia.

crus-galli var. pyracanthifolia Aiton, Hort. Kew. II. 170 (1789).—Pennsylvania to Florida and west to Indiana and Tennessee.

crus-galli var. rubens Sargent in N. Y. State Mus. Bull. CLXVII. 75 (1913).—New York (type locality, Chapinville).

crus-galli var. *salicifolia* (Medic.) Aiton, Hort. Kew II. 170 (1789) = C. crus-galli var. pyracanthifolia Ait. ?

crus-galli var. splendens Aiton, Hort. Kew. ed. 2, III. 202 (1811). (?)

crus-galli × macracantha Schneider, Ill. Handb. Laubh. II. 1007 (1912). (?)

crus-galli × pentagyna Schneider, Ill. Handb. Laubh. I. 778 (1906). (?)

crus-galli × prunifolia Koehne, Deutsche Dendr. 233 (1893). (?)

crus-galli × punctata Koehne, Deutsche Dendr. 233 (1893). (?)

crus-galli × succulenta Eggleston in N. Y. State Mus. Bull. CCXLIII–IV. 63 (1923). (?)

crux Ashe in Jour. Elisha Mitchell Sci. Soc. XVIII. 17 (1902).—**Macracanthae.**—North Carolina (type locality: along New River, Ashe County).

cullasagensis Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. 10 (1900).—**Flavae.**—North Carolina (type locality: along Cullasagee River, Macon County). (?)

culta Sargent in Rhodora, VII. 199 (1905).—**Tenuifoliae.**—Massachusetts (type locality: Shirley).

cuneifolia (Ehrh.) Borckhausen in Roemer, Arch. Bot. I. no. 3, 86 (1798). Group?—Range and type region of *Mespilus cuneifolia* Ehrh.: "Nordamerika." (?)

cuneiformis (Marsh.) Eggleston in Britton & Brown, Ill. Fl. ed. 2, II. 299 (1913).—**Punctatae.**—"Western New York and Pennsylvania to southwest Virginia, west to central Illinois" (type locality of *Mespilus cuneiformis* Marsh. not given). (?)

cuprea Sargent in Bot. Gaz. XXXV. 105 (1903).—**Intricatae.**—Delaware (type locality: Wilmington).

cupulifera Sargent in Proc. Rochester Acad. Sci. IV. 129 (1903).—**Rotundifoliae.**—New York (type locality: Rochester).

curabilis Ashe in Bull. Charleston Mus. XII. 43 (1916).—Group?—South Carolina (type locality: "lower edge of the Piedmont"). (?)

Curtisii Ashe in Bull. N. Car. Exper. Sta. CLXXV. 109 (1900).—Group?—North Carolina (type locality: Person County). (?)

curva Beadle in Biltmore Bot. Studies, I. 109 (1902).—**Flavae.**—Florida (type locality: Jacksonville).

Cuthbertii Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. 15 (1900).—Group?—North Carolina (type locality: Bladen County). (?)

CRATAEGUS

cyanophylla Sargent in Bot. Gaz. xxxv. 387 (1903).—**Tenuifoliae.**—Illinois, Wisconsin (type locality: Glendon Park, near Chicago, Ill.).

cyclophylla Sargent in Rhodora, vii. 210 (1905).—**Anomalae.**—Vermont (type locality: New Haven).

Cydonia Gruber in Bull. Torrey Bot. Club, xxxii. 390 (1905).—**Punctatae.**—Pennsylvania (type locality: Kutztown). (?)

dacrioides Sargent in Proc. Acad. Nat. Sci. Phila. lxii. 224 (1910).—**Rotundifoliae.**—Pennsylvania (type locality: Orbisonia).

dallasiana Sargent, Trees and Shrubs, i. 59 (1903).—**Punctatae.**—Texas (type locality: Dallas).

Damei Sargent in Rhodora, vii. 200 (1905).—**Tenuifoliae.**—Massachusetts (type locality: Lowell).

dapsilis Beadle in Biltmore Bot. Studies, i. 89 (1902).—**Flavae.**—Florida (type locality: Lane Park, near Tavares).

Darlingtoniana Sargent in Proc. Acad. Nat. Sci. Phila. lvii. 653 (1905).—**Intricatae.**—Pennsylvania (type locality: Serpentine Ridge, near West Chester).

dasyphylla Sargent in Rep. Missouri Bot. Gard. xxii. 80 (1912).—**Molles.**—Missouri, Kansas, Oklahoma (type locality: Joplin, Mo.).

Davisii Sargent in Rep. Missouri Bot. Gard. xxii. 77 (1912) = C. viridis L.

Dawsoniana Sargent in Rep. Missouri Bot. Gard. xix. 88 (1908).—**Virides.**—Illinois, Missouri (type locality: Arnold Arboretum, cultivated from seed collected near St. Louis, Mo.).

Dayana Sargent in N. Y. State Mus. Bull. cxxii. 66 (1908.)—**Coccineae.**—New York (type locality: Buffalo).

debilis Sargent in Ontario Nat. Sci. Bull. iv. 86 (1908).—**Macracanthae.**—Ontario (type locality: London).

decens Ashe in Jour. Elisha Mitchell Sci. Soc. xix. 19 (1903).—**Tenuifoliae.**—Ohio (type locality: Mansfield). (?)

declivitatis Sargent in Rep. Missouri Bot. Gard. xix. 103 (1908).—**Molles.**—Illinois, Missouri (type locality: St. Louis, Mo.).

decora Ashe in Jour. Elisha Mitchell Sci. Soc. xviii. 17 (1902).—Group?—North Carolina (type locality: Elk Cross Roads). (?)

decorata Sargent in Rep. Missouri Bot. Gard. xix. 94 (1908).—**Prunifoliae.**—Missouri (type locality: Swan).

deducta Sargent in Proc. Acad. Nat. Sci. Phila. lvii. 602 (1905).—**Pruinosae.**—Pennsylvania (type locality: Sellersville).

definita Sargent in Proc. Acad. Nat. Sci. Phila. lvii. 647 (1905).—**Intricatae.**—Pennsylvania (type locality: Newtown).

delawarensis Sargent in Bot. Gaz. xxxv. 102 (1903).—**Pruinosae.**—Delaware (type locality: between Newport and Newcastle).

CRATAEGUS

delecta Sargent, Man. Trees N. Am. 451 (1905).—**Coccineae.**—Illinois (type locality: Lockport).

delectabilis Sargent in Ontario Nat. Sci. Bull. IV. 90 (1908).—**Macracanthae.**—Ontario (type locality: Toronto).

delectata Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 200 (1910).—**Silvicolae.**—Pennsylvania (type locality: Keyser Valley, near Scranton).

delicata Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 606 (1905).—**Silvicolae.**—Pennsylvania (type locality: Sellersville).

Delosii Sargent in Ontario Nat. Sci. Bull. IV. 56 (1908).—**Intricatae.**—Ontario (type locality: Toronto).

deltoides Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. pt. 2, 19 (1901).—**Pruinosae.**—New York, Pennsylvania, Maryland (type locality not given).

delucida Sargent in Rhodora, v. 139 (1903).—**Tenuifoliae.**—New England, New York (type locality: East Rutland, Vt.).

demissa Sargent in Rhodora, v. 139 (1903).—**Tenuifoliae.**—New England to New York and Ohio (type locality: Lenox, Mass.).

denaria Beadle in Biltmore Bot. Studies, I. 131 (1902).—**Crus-galli.**—Mississippi (type locality: Columbus).

densiflora Sargent in Rhodora, III. 75 (1901).—**Coccineae.**—Quebec (type locality: Rockfield).

dentata Loddiges, Cat. 45 (1836), nomen nudum.—Loudon, Arb. Brit. II. 849 (1838), as a synonym of C. Crus-galli var. ovalifolia Lindl.

denudata Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 173 (1910).—**Pruinosae.**—Pennsylvania (type locality: Schenley Park, Pittsburgh).

depilis Sargent, Man. Trees N. Am. 419 (1905).—**Tenuifoliae.**—Illinois (type locality: Glendon Park, near Chicago.)

depressa Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. pt. 2, 8 (1901).—**Pruinosae.**—Northern Missouri (type locality not given).

desertorum Sargent in Jour. Arnold Arb. III. 187 (1922).—**Virides.**—Texas (type locality: Uvalde).

desueta Sargent in N. Y. State Mus. Bull. CXXII. 84 (1908).—**Punctatae.**—New York (type locality: Coopers Plains).

Deweyana Sargent in Proc. Rochester Acad. Sci. IV. 133 (1903).—**Macracanthae.**—New York (type locality: Rochester).

Dewingii Sargent in N. Y. State Mus. Bull. CXXII. 34 (1908).—**Punctatae.**—New York (type locality: Belfast).

diaphora Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 251 (1910).—**Macracanthae.**—Pennsylvania (type locality: Keyser Valley, near Scranton).

diffusa Sargent in Proc. Rochester Acad. Sci. IV. 103 (1903).—**Silvicolae.**—New England, New York (type locality: Rochester, N. Y.).

CRATAEGUS

digna Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 628 (1905).—**Molles.**—Pennsylvania (type locality: Kutztown).

dilatata Sargent in Bot. Gaz. XXXI. 9 (1901).—**Dilatatae.**—Quebec and New England to Ohio and Kentucky (type locality: eastern Massachusetts).

discolor Sargent in Rep. Missouri Bot. Gard. XIX. 44 (1908).—**Crus-galli.**—Missouri, Arkansas (type locality: Grandin, Mo.).

disjuncta Sargent, Trees and Shrubs, I. 109 (1903).—**Pruinosae.**—Missouri, Arkansas (type locality: Monteer, Mo.).

dispar Beadle in Biltmore Bot. Studies, I. 28 (1901).—**Flavae.**—South Carolina, Georgia (type locality: Aiken, S. Car.).

disperma Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. 14 (1900).—Group?—New York and Pennsylvania, west to Illinois (type locality: Wilkesbarre Mountain, Pa.). (?)

dispessa Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 17 (1903).—**Molles.**—Missouri (type locality of *C. pyriformis* Britton, which this name replaces: Monteer).

dissimilis Sargent in Rhodora, v. 149 (1903).—**Tenuifoliae.**—Connecticut (type locality: East Lyme).

dissociabilis Sargent in N. Y. State Mus. Bull. CXXII. 95 (1908).—**Silvicolae.**—New York (type locality: Coopers Plains).

dissona Sargent in Rhodora, v. 60 (1903).—**Silvicolae.**—Ontario and New England, west to northern Illinois and Wisconsin (type locality: Great Barrington, Mass.).

divergens (Peck) Sargent in N. Y. State Mus. Bull. CV. Bot. IX. 66 (1906).—**Rotundifoliae.**—New York (type locality: North Greenbush).

diversa Sargent in N. Y. State Mus. Bull. CXXII. 109 (1908).—**Macracanthae.**—New York (type locality: Coopers Plains).

diversifolia Sargent in Jour. Arnold Arb. VI. 4 (1925).—**Intricatae.**—Michigan (type locality of *C. Wheeleri* Sarg. which this name replaces: Grand Rapids).

divida Sargent in Bot. Gaz. XXXV. 401 (1903).—**Macracanthae.**—Illinois (type locality: Barrington).

divisifolia Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 179 (1910).—**Pruinosae.**—Pennsylvania, Ohio (type locality: Kutztown, Pa.).

Doddsii Ramaley in Bot. Gaz. XLVI. 381 (1908).—Colorado (type locality: Pole Canyon, near Boulder). (?)

Dodgei Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 26 (1903).—**Rotundifoliae.**—Southeastern Canada and New England, west to Michigan, Wisconsin and Indiana (type locality: Port Huron, Mich.).

Dodgei var. lumaria (Ashe) Sargent in Rep. Geol. Surv. Mich. 1906, 556 (1907).—Michigan (type locality: Port Huron).

CRATAEGUS

dolosa Beadle in Biltmore Bot. Studies, I. 90 (1902).—**Flavae.**—Alabama (type locality: Abbeville).

Douglasii Lindley in Bot. Reg. XXI. t. 1810 (1835).—**Douglasianae.**—British Columbia to California, east to Idaho, Montana and Wyoming (type locality: Garden of London Horticultural Society, from seed collected along lower Colorado River).

Douglasii f. badia Sargent in Bot. Gaz. XLIV. 65 (1907).—British Columbia, Washington (type locality: Union Flat, near Pullman, Wash.).

Douglasii var. *rivularis* (Nutt.) Sargent in Gard. & For. II. 401 (1889) = C. rivularis.

Douglasii var. Suksdorfii Sargent in Bot. Gaz. XLIV. 65 (1907).—Washington (type locality: western Klickitat County).

Downingii Hort. ex Nicholson in Hand-list Arb. Kew, pt. 1. 209 (1894), as synonym of C. tomentosa (?).

drymophila Sargent in Jour. Arnold Arb. I. (1920), as "drymopila".—**Silvicolae.**—Georgia, Alabama, Mississippi (type locality of *C. silvicola* Beadle, which this name replaces: Gadsden, Ala.).

dumetosa Sargent in Rep. Missouri Bot. Gard. XIX. 109 (1908.)—**Molles.**—Missouri (type locality: Neck City).

dumicola Sargent in Rhodora, V. 183 (1903).—**Macracanthae.**—Quebec, New England (type locality: Fort Fairfield, Me.).

Dunbari Sargent in Proc. Rochester Acad. Sci. IV. 126 (1903).—**Anomalae.**—New York (type locality: Rochester).

dunmorensis Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 174 (1910).—**Pruinosae.**—Pennsylvania (type locality: Dunmore).

duracina Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 186 (1910).—**Pruinosae.**—Pennsylvania (type locality: Whisky Hollow, near Kittanning).

durifolia Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. 12 (1900).—**Virides.**—Illinois, Missouri (type locality "Missouri"). (?)

durobrivensis Sargent, Trees and Shrubs, I. 3 (1902).—**Dilatatae.**—New York (type locality: Rochester).

Eamesii Sargent, Manual Trees N. Am. 454 (1905).—**Coccineae.**—Connecticut (type locality: Stratford).

Earlei Ashe in Bull. N. Car. Exper. Sta. CLXXV. 112 (1900).—**Uniflorae.**—Florida, Alabama (type locality: Cullman County, Ala.).

Eastmaniana Sargent in N. Y. State Mus. Bull. CLXVII. 77 (1913).—**Punctatae.**—New York (type locality: Durand-Eastman Park, Rochester).

Eatoniana Sargent in N. Y. State Mus. Bull. 105, Bot. IX. 51 (1906).—**Punctatae.**—New York (type locality: Menands golf grounds, near Albany).

ebracteata Ashe in Bull. N. Car. Exper. Sta. CLXXV. 109 (1900).—Group?—North Carolina (type locality: Winston). (?)

CRATAEGUS

eburnea Ashe in Ann. Carnegie Mus. I. 395 (1902).—**Crus-galli.**—Pennsylvania and Virginia to Ohio and Tennessee (type locality not given).

edita Sargent in Bot. Gaz. XXXIII. 110 (1902).—**Crus-galli.**—Louisiana, Texas (type locality: Marshall, Tex.).

Edsoni Sargent in Rhodora, VII. 205 (1905).—**Tenuifoliae.**—New England, New York (type locality: Burlington, Vt.).

edulis Loddiges, Cat. 39 (1826), nomen nudum.—Loudon, Arb. Brit. II. 818 (1838), as synonym of C. punctata var. aurea Ait.

edura Beadle in Biltmore Bot. Studies, I. 128 (1902).—**Crus-galli.**—Louisiana (type locality: Opelousas).

edurescens Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 180 (1910).—**Pruinosae.**—Pennsylvania (type locality: Edgemont Township, Delaware County).

effera Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 206 (1910).—**Silvicolae.**—Pennsylvania (type locality: Scranton).

efferata Sargent in N. Y. State Mus. Bull. CXXII. 128 (1908).—**Macracanthae.**—New York (type locality: Hemlock Lake).

efferta Sargent in Rep. Missouri Bot. Gard. XIX. 51 (1908).—**Crus-galli.**—Missouri (type locality, Pacific).

effulgens Sargent in Rep. Missouri Bot. Gard. XXII. 71 (1912).—**Crus-galli.**—Illinois, Tennessee, Missouri (type locality: Springfield, Mo.).

Eganii Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. 15 (1900).—**Tenuifoliae.**—Illinois (type locality "northern Illinois").

egens Beadle in Biltmore Bot. Studies, I. 85 (1902).—**Flavae.**—Florida (type locality: Bristol).

Eggertii Britton in Bull. N. Y. Bot. Gard. I. 447 (1900) = C. coccinoides Ashe.

Egglestonii Sargent in Rhodora, III. 30 (1901).—**Anomalae.**—New Hampshire, Vermont, Massachusetts (type locality: Bald Mountain, Shrewsbury, Vt.).

egregia Beadle in Biltmore Bot. Studies, I. 82 (1902).—**Flavae.**—Florida (type locality: Bristol).

elliptica Aiton, Hort. Kew, II. 168 (1789).*—Flavae. (?)

elliptica Elliot, Sketch, I. 549 (1821) = C. aestivalis T. & G.

ellipticifolia Sargent in Jour. Arnold Arb. III. 194 (1923).—**Pruinosae.**—Ohio (type locality: Delaware).

Ellwangeriana Sargent in Bot. Gaz. XXXIII. 118 (1902).—**Molles.**—Ontario, New York, Pennsylvania, Michigan (type locality: Rochester, N. Y.).

* I have seen only cultivated specimens of this plant, in which the principal distinction from *C. flava* appears to be in its 8–10 stamens and pale yellow anthers. Since the origin of the type cultivated in England is not definitely known the geographical range can not be given.

CRATAEGUS

elongata Sargent in Bot. Gaz. XXXV. 380 (1903).—**Coccineae.**—Illinois, Wisconsin (type locality: Deerfield, Ill.).

Emersoniana Sargent in Rhodora, VII. 181 (1905).—**Macracanthae.**—Massachusetts (type locality: Somerset).

Engelmannii Sargent in Bot. Gaz. XXXI. 2 (1901).—**Crus-galli.**—Southern Illinois and Kentucky to Missouri and Arkansas (type locality: Allenton, Mo.).

ensifera Sargent in Rep. Missouri Bot. Gard. XIX. 124 (1908).—**Macracanthae.**—Missouri (type locality: Swan).

enucleata Sargent, Trees and Shrubs, II. 239 (1913).—**Virides.**—Arkansas (type locality: Fulton).

erecta Sargent in Bot. Gaz. XXXI. 218 (1901).—**Crus-galli.**—Indiana and Illinois to Missouri and Arkansas (type locality: East St. Louis, Ill.).

errata Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 245 (1910).—**Anomalae.**—Pennsylvania (type locality: Keyser Valley, near Scranton).

erubescens Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 178 (1910).—**Pruinosae.**—Pennsylvania (type locality: Kittanning).

erythrocarpa Ashe in Bull. N. Car. Exper. Sta. CLXXV. 109 (1900).—Group?—North Carolina (type locality: Raleigh). (?)

erythropoda Ashe in Bull. N. Car. Exper. Sta. CLXXV. 113 (1900).—**Douglasianae.**—Colorado to Washington (type locality: foot-hills of Cache la Poudre Mountains, northern Colo.).

Evansiana Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 633 (1905).—**Rotundifoliae.**—Pennsylvania (type locality: West Fairmount Park, Philadelphia).

exclusa Sargent in Rhodora, V. 108 (1903).—**Molles.**—Vermont, New York, Ohio (type locality: Bald Mountain, Clarendon and Shrewsbury, Vt.).

exigua Sargent in Rhodora, V. 52 (1903) = C. crus-galli var. exigua.

exigua Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 20 (1903).—**Tenuifoliae.**—Wisconsin (type locality: Milwaukee). (?)

exilis Beadle in Biltmore Bot. Studies, I. 76 (1902).—**Flavae.**—Georgia (type locality: Albany).

eximia Beadle in Biltmore Bot. Studies, I. 62 (1902).—**Intricatae.**—Alabama (type locality: Sand Mountain, near Pisgah).

exornata Sargent in Ontario Nat. Sci. Bull. IV. 31 (1908).—**Pruinosae.**—Ontario, New York (type locality: Chippewa, Ont.).

extraria Beadle in Biltmore Bot. Studies, I. 73 (1902).—**Flavae.**—Georgia (type locality: Marietta).

fallax Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 11 (1903).—**Macracanthae.**—Michigan (type locality: Port Huron). (?)

fallsiana Sargent in N. Y. State Mus. Bull. CLXVII. 113 (1913).—**Anomalae.**—New York (type locality: Little Falls).

CRATAEGUS

Farwellii Sargent in Rep. Geol. Surv. Mich. 1906, 519 (1907).—**Crus-galli.**—Michigan (type locality: Bell Island, Detroit).

fastosa Sargent, Trees and Shrubs, I. 61 (1903).—**Punctatae.**—Arkansas (type locality: Fulton).

Faxonii Sargent in Rhodora, v. 161 (1903).—**Rotundifoliae.**—New Hampshire (type locality: Franconia).

fecunda Sargent in Bot. Gaz. XXXIII. 111 (1902).—**Crus-galli.**—Southern Illinois, Missouri (type locality: Arnold Arboretum from seed collected near Allenton, Mo.).

felix Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 589 (1905).—**Silvicolae.**—Pennsylvania (type locality: Reading).

fera Beadle in Biltmore Bot. Studies, I. 128 (1902).—**Crus-galli.**—Louisiana (type locality: Opelousas).

ferentaria Sargent in Proc. Rochester Acad. Sci. IV. 135 (1903).—**Macracanthae.**—Southeastern Canada, New England, New York (type locality: Rochester, N. Y.).

Fernaldii Sargent in Rhodora, v. 166 (1903).—**Rotundifoliae.**—Maine (type locality: Fort Fairfield and Fort Kent, Aroostook County).

ferox Sargent in Rep. Missouri Bot. Gard. XIX. 52 (1908) = C. arduennae Sarg.

Ferrissii Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. pt. 2, 11 (1901).—**Pruinosae.**—Illinois (type locality: "northern Illinois").

ferta Sargent in Ontario Nat. Sci. Bull. IV. 77 (1908).—**Macracanthae.**—Ontario (type locality: Toronto).

fertilis Sargent in Rhodora, v. 182 (1903).—**Macracanthae.**—Southeastern Canada, New England (type locality: Orono, Me.).

festiva Sargent in Rhodora, v. 54 (1903).—**Pruinosae.**—Connecticut (type locality: East Lyme).

filipes Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 18 (1903).—**Silvicolae.**—Michigan (type locality: Port Huron).

finitima Sargent in N. Y. State Mus. Bull. CXXII. 78 (1908).—**Macracanthae.**—New York (type locality: Niagara Falls).

firma Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 612 (1905).—**Tenuifoliae.**—Pennsylvania (type locality: Sellersburg).

flabellata (Bosc) K. Koch in Verh. Ver. Beförd, Gartenb. Preuss. ser. 2, I. 240 (Weissd. 20) (1853).—**Tenuifoliae.**—Southeastern Canada, New England and New York, west to northern Illinois (type locality of *Mespilus flabellata* Bosc: cultivated in Jardin des Plantes, Paris, from unknown source).

flagrans Sargent in N. Y. State Mus. Bull. CV. Bot. IX. 71 (1906).—**Macracanthae.**—New York (type locality: North Greenbush).

flammata Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 211 (1910).—**Tenuifoliae.**—Pennsylvania (type locality: Birdseye, near Scranton).

CRATAEGUS

flammea Sargent in Rep. Geol. Surv. Mich. 1906, 563 (1907).—**Macracanthae.**—Ontario, Michigan (type locality: Sarnia, Ont.).

flava Aiton, Hort. Kew. II. 169 (1789).—**Flavae.**—Georgia, Florida (type locality: cultivated in Royal Botanical Gardens, Kew. "Native of North America").

flava var. *elliptica* (Ait.) Sargent, Silva N. Am. IV. 114 (1892) = C. elliptica.

flava var. *integra* Nash in Bull. Torrey Bot. Club. XXII. 150 (1895) = C. integra.

flava var. *lobata* (Bosc) Lindley in Bot. Reg. XXIII. t. 1932 (1837) = C. elliptica Ait.

flava var. pubescens Gray, Man. ed. 2, 124 (1856). (?)

flavens Loddiges, Cat. 46 (1836), nomen nudum.—Loudon, Arb. Brit. II. 849 (1838), as synonym of *C. punctata flava.*

flavida Sargent in Rep. Geol. Surv. Mich. 1906, 554 (1907).—**Intricatae.**—Ontario, Michigan (type locality: London, Ont.).

flavo-carnis Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. 9 (1900).—Group?—North Carolina (type locality: Salisbury). (?)

flexispina (Moench) Sargent in Gard. & For. II. 424 (1889) = C. flava Ait.

flexispina var. *pubescens* (Gray) Millspaugh, Fl. W. Va. 360 (1892). (?)

flexuosa (Poir.) DeCandolle, Prodr. II. 627 (1825).—**Uniflorae.**—(Type region: "Carolina"). (?)

florea Sargent in Rhodora, V. 145 (1903).—**Tenuifoliae.**—Nova Scotia, Maine (type locality: Orono, Me.).

florens Beadle in Biltmore Bot. Studies, I. 94 (1902).—**Flavae.**—Georgia, Mississippi, Louisiana (type locality: Columbus, Miss.).

florida Loddiges, Cat. 46 (1836), nomen nudum.—Loudon, Arb. Brit. II. 841 (1838), as synonym of *C. parvifolia* Ait. = C. uniflora Muench.

floridana Sargent in Bot. Gaz. XXXIII. 124 (1902).—**Flavae.**—Florida (type locality: Jacksonville).

floridula Sargent in N. Y. State Mus. Bull. CXXII. 126 (1908).—**Anomalae.**—New York (type locality: Piseco).

florifera Sargent in Ontario Nat. Sci. Bull. IV. 14 (1908).—**Punctatae.**—Ontario (type locality: Toronto).

fluviatilis Sargent in Rhodora, V. 117 (1903) (as "fluviatalis").—**Coccineae.**—Quebec (type locality: Adirondack Junction).

foetida Ashe in Ann. Carnegie Mus. I. 389 (1902).—**Intricatae.**—Ontario, New England, New York, Pennsylvania (type locality: Berks County, Pa.).

foliata Sargent in N. Y. State Mus. Bull. CXXII. 53 (1908).—**Silvicolae.**—New York (type locality: Niagara Falls).

CRATAEGUS

Fontanesiana (Spach) Steudel, Nom. Bot. ed. 2, I. 432 (1840).—**Crus-galli.**—Pennsylvania. (Type locality of *Mespilus Fontanesiana* Spach not given, but species based upon plants cultivated in Europe.)

Fontanesiana β. angustifolia Lange, Rev. Gen. Crat. 63 (1897) = C. crus-galli var. pyracanthifolia Ait.?

Fontanesiana α. latifolia Lange, Rev. Gen. Crat. 63 (1897). (?)

Fontanesiana α. latifolia f. chlorocarpa Lange. 63 (1897). (?)

Forbesae Sargent in Rhodora, v. 151 (1903).—**Tenuifoliae.**—Massachusetts, Connecticut (type locality: Worcester County, Mass.).

formosa Sargent in Proc. Rochester Acad. Sci. IV. 101 (1903).—**Pruinosae.**—Ontario, New York, Ohio (type locality: Rochester, N. Y.).

fortis Beadle in Biltmore Bot. Studies, I. 92 (1902).—**Flavae.**—Mississippi (type locality: Columbus).

fortunata Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 239 (1910).—**Intricatae.**—Pennsylvania (type locality: Charleroi).

Fortunei Hort. ex Sargent in Jour. Arnold Arb. VI. 1 (1925), as a synonym of C. Fontanesiana Steud.

franklinensis Sargent in Jour. Arnold Arb. IV. 100 (1922).—**Pruinosae.**—Ohio (type locality: Columbus).

fretalis Sargent in Rhodora, v. 112 (1903).—**Coccineae.**—Connecticut (type locality: Groton).

Fretzii Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 604 (1905).—**Silvicolae.**—Pennsylvania (type locality: Durham).

fructuosa Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 232 (1910).—**Intricatae.**—Pennsylvania (type locality: West Chester).

frugalis Beadle in Biltmore Bot. Studies, I. 100 (1902).—**Flavae.**—Georgia (type locality: Albany).

frugiferens Beadle in Biltmore Bot. Studies, I. 30 (1901).—**Flavae.**—Alabama (type locality: Cullman).

frutescens Sargent in N. Y. State Mus. Bull. CXXII. 113 (1908).—**Macracanthae.**—New York (type locality: Coopers Plains).

fruticosa Sargent, Trees and Shrubs, I. 13 (1902).—**Uniflorae.**—Florida (type locality: Seville).

fucata Sargent in N. Y. State Mus. Bull. CXXII. 99 (1908).—**Tenuifoliae.**—New York (type locality: Coopers Plains).

fucosa Sargent in Rhodora, v. 137 (1903).—**Tenuifoliae.**—New Hampshire, Massachusetts (type locality: West Boylston, Mass.).

fulgens Sargent in Rhodora, VII. 182 (1905).—**Macracanthae.**—Massachusetts, Connecticut (type locality: Stratford, Ct.).

fulgida Sargent in Ontario Nat. Sci. Bull. IV. 84 (1908).—**Macracanthae.**—Ontario (type locality: Toronto).

Fulleriana Sargent in Proc. Rochester Acad. Sci. IV. 111 (1903).—**Molles.**—New York (type locality: Rochester).

CRATAEGUS

fulva Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 649 (1905).—**Intricatae.**—Pennsylvania (type locality: Forge Hill, Berks County).

furcata Sargent in Rep. Missouri Bot. Gard. XIX. 86 (1908) = C. viridis L.

furtiva Beadle in Biltmore Bot. Studies, I. 81 (1902).—**Flavae.**—Georgia (type locality: Albany).

fusca Sargent in Rhodora, VII. 193 (1905).—**Pruinosae.**—Vermont (type locality: Burlington).

galbans Beadle in Biltmore Bot. Studies, I. 74 (1902).—**Flavae.**—Florida (type locality: River Junction).

Gattingeri Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. 12 (1900).—**Pruinosae.**—Ohio Indiano, West Virginia, Illinois, Kentucky, Tennessee (type locality: Nashville, Tenn.).

gaudens Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 170 (1910).—**Pruinosae.**—Pennsylvania (type locality: Riverview Park, Allegheny City).

Gaultii Sargent in Bot. Gaz. XXXV. 397 (1903).—**Macracanthae.**—Illinois (type locality: Milton Township, Du Page County).

Gaylussacia Heller in Bull. S. California Acad. Sci. II. 69 (1903).—**Douglasianae.**—California (type locality: Sebastopol, Sonoma County).

gemmosa Sargent in Bot. Gaz. XXXIII. 119 (1902).—**Macracanthae.**—Ontario, and New York, west to Ohio, Wisconsin and Illinois (type locality: Grand Rapids, Mich.).

geneseensis Sargent in N. Y. State Mus. Bull. CXXII. 27 (1908).—**Crus-galli.**—New York (type locality: Rochester).

genialis Sargent in Rhodora, V. 148 (1903).—**Tenuifoliae.**—Onatrio, New England, New York (type locality: Stockbridge Bowl, Mass.).

geniculata Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. 16 (1900).—**Flavae.**—North Carolina (type locality: "middle North Carolina"). (?)

georgiana Sargent in Bot. Gaz. XXXIII. 113 (1902).—**Pruinosae.**—Georgia (type locality: Rome).

georgica Loddiges, Cat. 46 (1836), nomen nudum.—Loudon, Arb. Brit. II. 849 (1838), as synonym of C. spathulata Michx.

Gilbertiana Sargent in N. Y. State Mus. Bull. CLXVII. 101 (1913).—**Coccineae.**—New York (type locality: Warren).

gilva Beadle in Biltmore Bot. Studies, I. 60 (1902).—**Intricatae.**—Alabama (type locality: Albertville).

glabrata Sargent in Ontario Nat. Sci. Bull. IV. 85 (1908).—**Macracanthae.**—Ontario (type locality: Toronto).

glabrifolia Sargent in Rep. Missouri Bot. Gard. XXII. 74 (1912).—**Punctatae?**—Missouri (type locality: Grandin).

CRATAEGUS

glabriuscula Sargent in Bot. Gaz. XXXI. 235 (1901).—**Virides.**—Texas (type locality: Dallas).

glandulifera Loddiges, Cat. 46 (1836), nomen nudum.—Loudon, Arb. Brit. II. 849 (1838), as synonym of *C. pyrifolia* Ait.

glandulosa Moench, Bäume Weiss. 31 (1785) = C. macracantha Lodd.?

glandulosa β. Douglasii (Lindl.) K. Koch, Hort. Dendr. 167 (1853) = C. Douglasii.

glandulosa e. *elliptica* Lauche, Deutsche Dendr. 573 (1883). (?)

glandulosa β. macracantha (Lodd.) Lindley in Bot. Reg. XXII. t. 1912 (1836) = C. macracantha.

glandulosa c. *odorata* (Wendl.) Lauche, Deutsche Dendr. 573 (1883). (?)

glandulosa γ. purpurea (Bosc) K. Koch, Hort. Dendr. 167 (1853). (?).

glandulosa δ. rotundifolia (Moench) K. Koch, Hort. Dendr. 167 (1853) = C. rotundifolia.

glandulosa ε. succulenta (Schrad.) K. Koch, Hort. Dendr. 167 (1853) = C. succulenta.

glandulosa α. typica Regel in Act. Hort. Petrop. I. 120 (1871) = C. Bicknellii Eggleston.

glareosa Ashe in Jour. Elisha Mitchell Sci. Soc. XVIII. 21 (1902).—**Pruinosae?**—Michigan (type locality: Port Huron).

glaucophylla Sargent in Rhodora, v. 140 (1903).—**Tenuifoliae.**—Ontario, New England, New York, Pennsylvania and Michigan (type locality: Great Barrington, Mass.).

globosa Sargent in Rep. Missouri Bot. Gard. XIX. 118 (1908).—**Macracanthae.**—Missouri (type locality: Monteer).

gloriosa Sargent in N. Y. State Mus. Bull. CXXII. 70 (1908) = C. pedicellata var. gloriosa Sarg.

gracilipes Sargent in N. Y. State Mus. Bull. CXXII. 119 (1908).—**Tenuifoliae.**—New York (type locality: Hemlock Lake, Livingston County).

gracilis Sargent in N. Y. State Mus. Bull. CXXII. 37 (1908).—**Pruinosae.**—New York, Ohio, Indiana (type locality: Niagara Falls, N. Y.).

grandis Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. pt. 2, 9 (1901).—**Punctatae.**—Illinois (type locality not given). (?)

gratiosa Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 243 (1910).—**Intricatae.**—Pennsylvania (type locality: Bedford Springs).

Gravesii Sargent in Rhodora, v. 159 (1903) = C. Dodgei Ashe.

gravida Beadle in Biltmore Bot. Studies, I. 119 (1902).—**Molles.**—Tennessee (type locality: Nashville).

gravis Ashe in Jour. Elisha Mitchell Sci. Soc. XX. 49 (1904).—**Silvicolae.**—Ontario, Michigan, Ohio (type locality: Port Huron, Mich.).

Grayana Eggleston in Rhodora, X. 80 (1908) = C. flabellata K. Koch.

CRATAEGUS

gregalis Beadle in Biltmore Bot. Studies, I. 118 (1902).—**Uniflorae.**—North Carolina, South Carolina (type locality: Biltmore, N. Car.).

Greggiana Eggleston in Bull. Torrey Bot. Club, XXXVI. 511 (1909).—**Molles.**—Mexico (type locality: Saltillo, Coahuila).

grossa Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 223 (1910).—**Rotundifoliae.**—Pennsylvania (type locality: Bedford Springs).

grossiserrata Ashe in Bull. N. Car. Exper. Sta. CLXXV. 112 (1900).—**Uniflorae.**—Florida (type locality not given). (?)

grossulariaefolia Loddiges, Cat. 39 (1826), nomen nudum.—Loudon, Arb. Brit. II. 849 (1838) as synonym of *C. crus-galli* var. *prunifolia.*

Gruberi Ashe in Ann. Carnegie Mus. I. 388 (1902).—**Tenuifoliae.**—Pennsylvania (type locality: Berks County).

Habereri Sargent in N. Y. State Mus. Bull. CXVI. Bot. X. 21 (1907).—**Tenuifoliae.**—New York (type locality: New Hartford).

habilis Ashe in Bot. Gaz. XXXV. 435 (1903).—**Coccineae.**—Ohio (type locality: Mansfield). (?)

Hadleyana Sargent in N. Y. State Mus. Bull. CLXVII. 93 (1913).—**Tenuifoliae.**—Ontario, New York (type locality: Herkimer).

haemacarpa Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. 8 (1900).—**Pruinosae.**—North Carolina (type locality: banks of Cullassagee River, Macon County).

Halliana Sargent in N. Y. State Mus. Bull. CV. Bot. IX. 73 (1906).—**Macracanthae.**—New York (type locality: North Albany).

hamata Sargent in Rep. Missouri Bot. Gard. XIX. 46 (1908).—**Crus-galli.**—Missouri (type locality: Pacific).

Handyae Sargent in Rhodora, VII. 177 (1905).—**Macrospermae.**—Massachusetts (type locality: Somerset).

Harbisonii Beadle in Bot. Gaz. XXVIII. 413 (1899).—**Bracteatae.**—Tennessee (type locality: Nashville).

Hargeri Sargent in Rhodora, V. 66 (1903).—**Intricatae.**—Connecticut (type locality: Oxford).

Harryi Sargent in N. Y. State Mus. Bull. CXXII. 124 (1908).—**Rotundifoliae.**—New York (type locality: Richmond).

Harveyana Sargent in Jour. Arnold Arb. III. 200 (1923).—**Intricatae.**—Arkansas (type locality: Eureka Springs).

heidelbergensis Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 215 (1910).—**Tenuifoliae.**—Pennsylvania (type locality: Kutztown).

helderbergensis Sargent in N. Y. State Mus. Bull. CV. Bot. IX. 49 (1906).—**Crus-galli.**—New York (type locality: Thompsons Lake, Albany County).

Helenae Sargent in Rhodora, VII. 162 (1905).—**Macracanthae.**—Massachusetts (type locality: Southboro).

helvina Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 28 (1903).—**Crus-galli.**—Tennessee (type locality: Clarkton). (?)

CRATAEGUS

Hillii Sargent in Bot. Gaz. xxxv. 384 (1903).—**Coccineae.**—Ohio, Indiana, Illinois (type locality: Thatchers Park, Cook County, Ill.).

hirtella Sargent in Rep. Missouri Bot. Gard. xix. 62 (1908).—**Crus-galli.**—Missouri (type locality: Swan).

hirtiflora Sargent in Rep. Missouri Bot. Gard. xix. 82 (1908), as "hertiflora."—**Punctatae.**—Missouri (type locality: Swan).

hispidula Sargent in Rep. Missouri Bot. Gard. xix. 116 (1908).—**Macracanthae.**—Illinois, Missouri, Arkansas, Texas (type locality: Carthage, Mo.).

Holmesiana Ashe in Jour. Elisha Mitchell Sci. Soc. xvi. 78 (1900).—**Coccineae.**—Southeastern Canada and New England to New York and Pennsylvania (type locality: "central New York").

Holmesiana var. tardipes Sargent in Jour. Arnold Arb. i. 254 (1920).—Southeastern Canada, New York, Ohio (type locality of *C. tardipes* Sarg.: Toronto, Ont.).

Holmesiana var. villipes Ashe in Jour. Elisha Mitchell Sci. Soc. xvii. pt. 2, 11 (1901).—Pennsylvania, New York (type locality not given).

honeoyensis Sargent in N. Y. State Mus. Bull. cxxii. 129 (1908).—**Macracanthae.**—New York (type locality: west of Honeoye Lake, Ontario County).

honesta Sargent in Rep. Geol. Surv. Mich. 1906, 558 (1907).—**Anomalae.**—Michigan (type locality: Grand Rapids).

horrida Medicus, Gesch. Bot. 84 (1793).—**Crus-galli.** (?)

horridula Sargent in Rep. Geol. Surv. Mich. 1906, 526 (1907).—**Pruinosae.**—Michigan, Ohio (type locality: Grand Rapids, Mich.).

Howeana Sargent in N. Y. State Mus. Bull. cv. Bot. ix. 52 (1906).—**Pruinosae.**—New York, Ohio (type locality: Menands, near Albany, N. Y.).

Howellii Heiser in Am. Midland Naturalist, v. 238 (1919) = C. columbiana Howell.

hudsonica Sargent, Man. Trees N. Am. 457 (1905).—**Dilatatae.**—New York (type locality: Albany).

Huntiana Sargent in N. Y. State Mus. Bull. clxvii. 105 (1913).—**Molles.**—New York (type locality: between Jordanville and Mud Lake, Herkimer County).

hystricina Ashe in Bot. Gaz. xxxv. 433 (1903).—**Macracanthae.**—Connecticut, New York (type locality: along Housatonic River, southern Connecticut).

hybrida Loddiges, Cat. 46 (1836), nomen nudum.—Loudon, Arb. Brit. ii. 849 (1838), as synonym of *C. crus-galli prunifolia.* (?)

hypolasia K. Koch, Hort. Dendr. 167 (1853) = C. mexicana Moç. & Sessé.

CRATAEGUS

Ideae Sargent in Rhodora, VII. 211 (1905).—**Anomalae.**—Vermont (type locality: Concord).

ignava Beadle in Biltmore Bot. Studies, I. 31 (1901).—**Flavae.**—Alabama (type locality: Valley Head).

ignava Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 228 (1910) = C. neosmithii Sarg.

ignea Sargent in N. Y. State Mus. Bull. CXXII. 96 (1908).—**Tenuifoliae.**—New York, Indiana (type locality: Coopers Plains, N. Y.).

illecebrosa Sargent in Jour. Arnold Arb. IV. 103 (1923).—**Coccineae.**—Ontario (type locality: Kingston).

illinoiensis Ashe in Jour. Elisha Mitchell Sci. Soc. XVI. 76 (1900).—**Macracanthae.**—Illinois (type locality: Wady Petra).

illudens Beadle in Biltmore Bot. Studies, I. 111 (1902).—**Flavae.**—Florida (type locality: Citra).

illuminata Sargent in N. Y. State Mus. Bull. CV. Bot. IX. 65 (1906).—**Rotundifoliae.**—New York (type locality: North Albany).

illustris Beadle in Biltmore Bot. Studies, I. 68 (1902).—**Pulcherrimae.**—Mississippi (type locality: Meridian).

immanis Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 22 (1903).—**Pruinosae.**—Ohio, Michigan (type locality: Port Huron).

immitis Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 28 (1903).—**Crus-galli.**—Pennsylvania (type locality: Delaware County). (?)

impar Beadle in Biltmore Bot. Studies, I. 72 (1902).—**Flavae.**—Georgia (type locality: Marietta).

impervia Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 197 (1910).—**Silvicolae.**—Pennsylvania (type locality: Dunmore, near Scranton).

implicata Sargent in N. Y. State Mus. Bull. CXXII. 49 (1908).—**Silvicolae.**—New York (type locality: Buffalo).

improvisa Sargent in Ontario Nat. Sci. Bull. IV. 69 (1908).—**Anomalae.**—Ontario (type locality: Toronto).

inanis Beadle in Biltmore Bot. Studies, I. 62 (1902).—**Intricatae.**—Alabama (type locality: Albertville).

inaudita Sargent in Ontario Nat. Sci. Bull. IV. 64 (1908).—**Rotundifoliae.**—Ontario (type locality: Chippewa).

incaedua Sargent, Trees and Shrubs, II. 3 (1907).—**Punctatae.**—Missouri (type locality: Monteer).

incana Beadle in Biltmore Bot. Studies, I. 113 (1902).—**Flavae.**—Florida (type locality: Bristol).

incerta Sargent in Rep. Geol. Surv. Mich. 1906, 523 (1907).—**Punctatae.**—Michigan (type locality: Port Huron).

incilis Beadle in Biltmore Bot. Studies, I. 41 (1901).—**Pulcherrimae.**—Alabama (type locality: Evergreen).

incisa Sargent in Rhodora, VII. 196 (1905).—**Pruinosae.**—Connecticut (type locality: Stratford).

CRATAEGUS

incompta Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 183 (1910).—**Pruinosae.**—Pennsylvania (type locality: Scranton).

indentata Loddiges, Cat. 46 (1836), nomen nudum.—Loudon, Arb. Brit. II. 817 (1838), as synonym of *C. coccinea* var. *indentata.* (?)

indicens Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 27 (1903).—**Punctatae.**—Ohio (type locality: Mansfield). (?)

indigens Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 13 (1903).—**Uniflorae.**—North Carolina (type locality: Moore County). (?)

inducta Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 24 (1903).—**Intricatae.**—Pennsylvania (type locality not given).

induta Sargent, Trees and Shrubs, I. 115 (1903).—**Molles.**—Arkansas (type locality: Fulton).

infensa Sargent in Proc. Acad. Nat Sci. Phila. LXII. 201 (1910).—**Silvicolae.**—Pennsylvania (type locality: Charleroi).

infera Sargent in Proc. Acad. Nat Sci. Phila. LVII. 651 (1905).—**Intricatae.**—Pennsylvania (type locality: Sellersville).

infesta Sargent in Rep. Missouri Bot. Gard. XIX. 45 (1908).—**Crus-galli.**—Missouri (type locality: Pacific).

ingens Beadle in Biltmore Bot. Studies, I. 56 (1902).—**Virides.**—Tennessee (type locality: Chattanooga).

ingestria Loddiges, Cat. 46 (1836), nomen nudum.—Loudon, Arb. Brit. II. 821 (1838), as var. of C. prunifolia; l.c., 849, as synonym of *C.? crus-galli prunifolia* = C. prunifolia Pers.?

ingrata Ashe in Jour. Elisha Mitchell Sci. Soc. XX. 54 (1904).—**Pruinosae.**—Pennsylvania (type locality: Pittsburgh). (?)

inopina Beadle in Biltmore Bot. Studies, I. 107 (1902).—**Flavae.**—Florida (type locality: Ocala). (?)

inopinata Sargent in N. Y. State Mus. Bull. CXXII. 108 (1908).—**Anomalae.**—New York (type locality: Coopers Plains).

inops Beadle in Biltmore Bot. Studies, I. 96 (1902).—**Flavae.**—Alabama (type locality: Ozark). (?)

insidiosa Beadle in Biltmore Bot. Studies, I. 94 (1902).—**Flavae.**—Georgia, Alabama (type locality: Ozark, Ala.).

insignata Sargent in N. Y. State Mus. Bull. CXXII. 101 (1908).—**Tenuifoliae.**—New York (type locality: Coopers Plains).

insignis Sargent, Trees and Shrubs, I. 107 (1903).—**Crus-galli.**—Illinois (type locality: Kahokia).

insolens Sargent in Rhodora, VII. 217 (1905).—**Rotundifoliae.**—Vermont (type locality: Concord).

insolita Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 622 (1905).—**Tenuifoliae.**—Pennsylvania (type locality: Collen Brook, Upper Darby).

insperata Sargent in Rep. Missouri Bot. Gard. XIX. 123 (1908).—**Macracanthae.**—Missouri (type locality: Carthage).

CRATAEGUS

insueta Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 599 (1905).—**Pruinosae.**—Pennsylvania (type locality: West Fairmount Park, Philadelphia, cultivated from unknown source).

integra (Nash) Beadle in Biltmore Bot. Studies, I. 87 (1902).—**Flavae.**—Florida (type locality of *C. flava* var. *integra* Nash: Lake Ella).

integriloba Sargent in Rhodora, III. 78 (1901).—**Macracanthae.**—Quebec (type locality: Caughnawaga).

interior Beadle in Biltmore Bot. Studies, I. 52 (1902).—**Virides.**—Tennessee, Alabama, Mississippi (type locality: Chattanooga, Tenn.).

intermixta Sargent in Jour. Arnold Arb. III. 5 (1922).—**Crus-galli.**—Missouri (type locality: Riverside Park, Hannibal).

intricata Lange in Bot. Tidsskr. XIX. 264 (1895).—**Intricatae.**—New England and New York to Pennsylvania and West Virginia (type locality: Botanical Garden of Copenhagen, cultivated).

insitula Sargent in N. Y. State Mus. Bull. CXXII. 55 (1908).—**Pruinosae.**—New York (type locality: Chapinville).

invicta Beadle in Biltmore Bot. Studies, I. 37 (1901).—**Flavae.**—Georgia (type locality: Doctortown).

invisa Sargent, Trees and Shrubs, II. 147 (1911).—**Molles.**—Arkansas, Oklahoma, Texas (type locality: Fulton, Ark.).

iracunda Beadle in Biltmore Bot. Studies, I. 124 (1902).—**Pruinosae.**—Georgia (type locality: Rome).

irrasa Sargent in Rhodora, V. 116 (1903).—**Coccineae.**—Quebec, New York (type locality: Sault au Ricollet, Montreal Island, Que.).

irrasa var. *Blanchardi* (Sarg.) Eggleston in Rhodora, X. 79 (1908) = C. Blanchardii.

irrasa var. *divergens* Peck in N. Y. State Mus. Bull. LXXV. Bot. VII. 51 (1904) = C. divergens.

iterata Sargent in Jour. Arnold Arb. IV. 102 (1923).—**Silvicolae.**—New York (type locality of *C. seclusa* Sarg., which this name replaces: Hemlock Lake, Livingston County).

Jackii Sargent in Rhodora, V. 162 (1903).—**Rotundifoliae.**—Quebec (type locality: Caughnawaga).

jasperensis Sargent in Rep. Missouri Bot. Gard. XIX. 61 (1908).—**Crus-galli.**—Missouri (type locality: Webb City).

jejuna Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 593 (1905).—**Pruinosae.**—Pennsylvania, Ohio (type locality: Sellersville, Pa.).

Jenningsii Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 241 (1910).—**Intricatae.**—Pennsylvania, Ohio (type locality: Kittanning, Pa.).

Jesupii Sargent in Rhodora, V. 611 (1903).—**Pruinosae.**—Vermont (type locality: West Rutland).

Jonesae Sargent in Bot. Gaz. XXXI. 14 (1901).—**Rotundifoliae.**—Southeastern Canada, Maine (type locality: Bar Harbor, Me.).

CRATAEGUS

Keepii Sargent in Rhodora, v. 165 (1903).—**Rotundifoliae.**—Maine (type locality: Fort Fairfield).

Kellermanii Sargent, Trees and Shrubs, II. 239 (1913).—**Pruinosae.**—Ohio, Kentucky (type locality: Dennison, O.).

Kelloggii Sargent, Trees and Shrubs, I. 117 (1903).—**Molles.**—Missouri (type locality: St. Louis).

Kilmanii Loddiges, Cat. 46 (1836), nomen nudum.—Loudon, Arb. Brit. II. 849 (1838) as synonym of *C.? coccinea* var. *maxima*, Lodd.

Kennedyi Sargent, Trees and Shrubs, II. 73 (1903).—**Rotundifoliae.**—Vermont (type locality: summit of Willoughby Mountain, Orleans County).

kingstonensis Sargent in Jour. Arnold Arb. III. 205 (1922).—**Rotundifoliae.**—Ontario (type locality: Kingston).

Kinzerae Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 234 (1910).—**Intricatae.**—Pennsylvania (type locality: Schenley Park, Pittsburgh).

Knieskerniana Sargent in N. Y. State Mus. Bull. CLXVII. 116 (1913).—**Anomalae.**—Quebec, New York (type locality: East Herkimer, N. Y.).

lacera Sargent in Bot. Gaz. XXXIII. 123 (1902).—**Tenuifoliae?**—Arkansas (type locality: Fulton).

lacrimata Small in Torreya, I. 97 (1901).—**Flavae.**—Florida (type locality: Crestview).

laetans Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 205 (1910).—**Silvicolae.**—Pennsylvania (type locality: Pittsburgh).

laetifica Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 250 (1910).—**Intricatae.**—Pennsylvania (type locality: Bedford).

laetula Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 233 (1910).—**Intricatae.**—Pennsylvania (type locality: Newtown).

lanata Beadle in Biltmore Bot. Studies, I. 86 (1902).—**Flavae.**—North Carolina, Georgia (type locality: McGuire's Mill, Gwinnett County, Ga.).

lanceolata Sargent, Trees and Shrubs, II. 65 (1908).—**Virides.**—Missouri (type locality: St. Louis).

lancifolia Wenderoth, Ind. Sem. Hort. Marb. (1825) ex Flora, IX. pt. 1, 354 (1826) = C. crus-galli var. pyracanthifolia Ait.

Laneyi Sargent, Trees and Shrubs, I. 5 (1902).—**Macracanthae.**—New York (type locality: Rochester).

lanigera Sargent in Rep. Missouri Bot. Gard. XIX. 107 (1908).—**Molles.**—Illinois, Kentucky, Missouri (type locality: East St. Louis, Ill.).

lanuginosa Sargent, Trees and Shrubs, I. 113 (1903).—**Molles.**—Missouri, Kansas, Arkansas (type locality: Webb City, Mo.).

larga Sargent in Rep. Missouri Bot. Gard. XIX. 85 (1908).—**Virides.**—Illinois (type locality: Cahokia).

CRATAEGUS

lasiantha Sargent in Rep. Missouri Bot. Gard. XIX. 105 (1908).—**Molles.**—Missouri, Kansas, Oklahoma (type locality: Webb City, Mo.).

lassa Beadle in Biltmore Bot. Studies, I. 29 (1901).—**Flavae.**—Alabama (type locality: Selma).

lata Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 610 (1905).—**Tenuifoliae.**—Pennsylvania (type locality: Sellersville).

latebrosa Sargent in Rep. Missouri Bot. Gard. XXII. 73 (1912).—**Punctatae.**—Missouri, Arkansas (type locality: Noel, Mo.).

latiflora Sargent in N. Y. State Mus. Bull. CLXVII. 83 (1913).—**Pruinosae.**—New York (type locality: Richmond, Livingston County).

latifolia Persoon, Syn. II. 37 (1807) = C. tomentosa L.?

latifrons Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 181 (1910).—**Pruinosae.**—Pennsylvania (type locality: Orbisonia).

latisepala Ashe in Bull. N. Car. Exper. Sta. CLXXV. 109 (1900).—**Pruinosae.**—Michigan, Ohio (type locality: "eastern Michigan").

laurentiana Sargent in Rhodora, III. 77 (1901).—**Macracanthae.**—Quebec (type locality: Caughnawaga).

laurifolia Medicus, Gesch. Bot. 84 (1793).—**Crus-galli.**—(?).

lauta Sargent in Rhodora, VII. 206 (1905).—**Molles.**—Known only in cultivation. (Type locality: Olmstead Park, Boston, Mass.).

lawrencensis Sargent in Jour. Arnold Arb. III. 3 (1922).—**Crus-galli.**—Missouri (type locality: Larussell).

laxa Beadle in Biltmore Bot. Studies, I. 103 (1902).—**Flavae.**—Alabama (type locality: Phoenix City).

laxiflora Sargent in Bot. Gaz. XXXV. 400 (1903).—**Macracanthae.**—Illinois (type locality: Mokena).

lecta Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 187 (1910).—**Pruinosae.**—Pennsylvania (type locality: between Carnot and Stoope's Ferry, Allegheny County).

leimonia Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 194 (1910).—**Silvicolae.**—Pennsylvania (type locality: Kittanning).

leioclada Sargent in Rep. Missouri Bot. Gard. XIX. 113 (1908).—**Intricatae.**—Missouri, Arkansas (type locality: Swan, Mo.).

leiophylla Sargent in Proc. Rochester Acad. Sci. IV. 99 (1903).—**Pruinosae.**—New York, Pennsylvania, Ohio, Indiana (type locality: Rochester, N. Y.).

leiophylla var. *maineana* (Sarg.) Eggleston in Rhodora, X. 81 (1908) = C. maineana.

lemingtonensis Sargent in Rhodora, VII. 216 (1905).—**Rotundifoliae.**—Vermont, New Hampshire (type locality: Lemington, Vt.).

lenis Beadle in Biltmore Bot. Studies, I. 67 (1902).—**Pulcherrimae.**—Alabama (type locality: Greenville). (?)

CRATAEGUS

Lennoniana Sargent in Proc. Rochester Acad. Sci. IV. 98 (1903).—**Pruinosae.**—New York (type locality: Rochester).

lenta Ashe in Jour. Elisha Mitchell Sci. Soc. XVIII. 18 (1902).—**Coccineae.**—Quebec, Michigan (type locality: Port Huron, Mich.).

lentula Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 25 (1903).—**Intricatae.**—North Carolina (type locality: Catawba).

lepida Beadle in Biltmore Bot. Studies, I. 36 (1901).—**Flavae.**—Georgia, Florida (type locality: Waycross, Ga.).

leptalea Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 231 (1910).—**Intricatae.**—Pennsylvania (type locality: Bedford Springs).

leptophylla Sargent in Rep. Missouri Bot. Gard. XIX. 69 (1908).—**Crus-galli.**—Missouri (type locality: Osage).

leptopoda Sargent in N. Y. State. Mus. Bull. CXXII. 118 (1908).—**Tenuifoliae.**—New York (type locality: Hemlock Lake, Livingston County).

Letchworthiana Sargent in N. Y. State Mus. Bull. CXXII. 68 (1908).—**Coccineae.**—New York (type locality: Portage).

Lettermanii Sargent in Bot. Gaz. XXXI. 220 (1901).—**Punctatae.**—Missouri (type locality: Allenton).

leucophleos Moench, Bäume Weiss. 31 (1785).—**Macracanthae.**—(?)

levis Sargent in Rhodora, VII. 198 (1905).—**Pruinosae.**—Connecticut (type locality: Litchfield).

limaria Sargent, Trees and Shrubs, II. 149 (1911).—**Molles.**—Arkansas, Oklahoma, Texas, Mexico (type locality: Fulton, Ark.).

limata Beadle in Biltmore Bot. Studies, I. 77 (1902).—**Flavae.**—Georgia (type locality: Warm Springs).

limatula Sargent in Ontario Nat. Sci. Bull. IV. 16 (1908), as "limatala".—**Punctatae.**—Ontario (type locality: London).

limnophylla Sargent in Jour. Arnold Arb. III. 3 (1922).—**Crus-galli.**—Florida (type locality: St. Marks).

limosa Sargent in N. Y. State Mus. Bull. CXXII. 67 (1908).—**Coccineae.**—New York (type locality: Rochester).

Lindenii Stapf in Kew Bull. Misc. Inform. 1914, 326 (1914).—Group?—Mexico (type locality: Chiapas, Ciudad Real). (?)

linearifolia Hort. ex Nicholson in Hand-list Arb. Kew, pt. 1, 197 (1894) as synonym of *C. crus-galli* var. *linearis* DC.

linearis Persoon, Syn. II. 37 (1807) = C. crus-galli var. pyracanthifolia Ait.

littoralis Sargent in Rhodora, V. 59 (1903).—**Pruinosae.**—Connecticut (type locality: Waterford).

Livingstoniana Sargent in N. Y. State Mus. Bull. CXXII. 116 (1908).—**Silvicolae.**—New York (type locality: Hemlock Lake, Livingston County).

CRATAEGUS

livoniana Sargent, Trees and Shrubs, II. 3 (1908).—**Crus-galli.**—New York (type locality: Hemlock Lake).

lobata (Poir.) Bosc in DeCandolle, Prodr. II. 628 (1825).—**Macracanthae.**—(?)

lobulata Sargent in Rhodora, III. 22 (1901).—**Coccineae.**—New England, New York (type locality: New Haven, Vt.).

locuples Sargent in Rep. Missouri Bot. Gard. XIX. 97 (1908).—**Pruinosae.**—Missouri (type locality: Barretts Station).

Loddigesii Hort. ex Nicholson in Hand-list Arb. Kew, pt. 1, 207 (1894) as synonym of C. punctata Jacq.

longipedunculata Sargent in Ontario Nat. Sci. Bull. IV. 26 (1908).—**Pruinosae.**—Ontario, New York, Ohio (type locality: Chippewa, Ont.).

longipetiolata Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 621 (1905).—**Tenuifoliae.**—Pennsylvania (type locality: Sellersville).

longispina Sargent in Bot. Gaz. XXXV. 398 (1903).—**Macracanthae.**—Illinois (type locality: Lake Zurich).

lucida Miller, Dict. ed. 8, no. 6 (1768) = C. crus-galli L.

lucida Elliot, Sketch, I. 548 (1821) = C. aestivalis T. & G.?

lucorum Sargent in Bot. Gaz. XXXI. 227 (1901).—**Tenuifoliae.**—New York, Ohio, Illinois (type locality: Barrington, Ill.).

lucorum var. *insolens* (Sarg.) Eggleston in Rhodora, X. 79 (1908) = C. insolens.

luculenta Sargent, Trees and Shrubs, I. 11 (1902) = C. aestivalis var. cerasoides f. luculenta Sarg.

ludoviciensis Sargent, Trees and Shrubs, II. 5 (1907).—**Virides.**—Missouri (type locality: St. Louis).

lumaria Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 25 (1903) = C. Dodgei var. lumaria Sarg.

luminosa Sargent in N. Y. State Mus. Bull. CXXXII. 63 (1908).—**Tenuifoliae.**—New York (type locality: Buffalo).

lutea Poiret apud Jackson, Ind. Kew. I. 636 (1893), as synonym of C. tomentosa L.—*Mespilus lutea* Poiret in Lamarck, Encycl. Meth. Suppl. IV. 71 (1816).

lutensis Sargent in Rep. Missouri Bot. Gard. XXII. 75 (1912).—**Virides.**—Missouri, Oklahoma (type locality: Reding's Mill, near Joplin, Mo.).

luteola Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 240 (1910).—**Intricatae.**—Pennsylvania (type locality: Orbisonia).

luxuriosa Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 198 (1910).—**Silvicolae.**—Pennsylvania (type locality: Kittanning).

Macauleyae Sargent in Proc. Rochester Acad. Sci. IV. 130 (1903).—**Rotundifoliae.**—New York (type locality: Genessee Valley Park, Rochester).

macera Sargent in N. Y. State Mus. Bull. CXXII. 117 (1908).—**Silvicolae.**—Ontario, New York (type locality: Hemlock Lake, N. Y.).

macilenta Beadle in Biltmore Bot. Studies, I. 64 (1902).—**Intricatae.**—Alabama (type locality: Albertville).

Mackensenii Sargent, Trees and Shrubs, II. 242 (1913) = C. limaria Sarg.

Mackenzii Sargent in Mackenzie, Man. Fl. Jackson County, Mo. 108 (1902).—**Pruinosae.**—Missouri (type locality: Jackson County).

Macnabiana Hort. ex Nicholson in Hand-list Arb. Kew, pt. 1, 199 (1894), as synonym of *C. Douglasii* var. *rivularis* Sarg.

Macounii Sargent in Ontario Nat. Sci. Bull. IV. 41 (1908).—**Coccineae.**—Ontario (type locality: Toronto).

macra Beadle in Biltmore Bot. Studies, I. 134 (1902).—**Crus-galli.**—North Carolina, Georgia, Mississippi (type locality: Rome, Ga.).

macracantha Loddiges, Cat. 46 (1836), nomen nudum.—Loudon, Arb. Brit. II. 819 (1838).—**Macracanthae.**—Ontario, Vermont and New York to northern Illinois. (First known and described from plants cultivated in European gardens.)

macracantha var. minor Loudon, Arb. Brit. II. 819 (1838). (?)

macracantha var. *neofluvialis* (Ashe) Eggleston in Rhodora, X. 83 (1908) = C. neofluvialis.

macracantha var. *occidentalis* (Britton) Eggleston in Rhodora, X. 82 (1908) = C. succulenta Schrad.?

macracantha var. *rhombifolia* (Sarg.) Eggleston in Rhodora, X. 82 (1908) = C. rhombifolia.

macracantha var. *succulenta* (Schrad.) Rehder in Bailey, Cycl. Am. Hort. I. 396 (1900) = C. succulenta.

macrocalyx Sargent in N. Y. State Mus. Bull. CXXII. 89 (1908).—**Pruinosae.**—New York (type locality: Coopers Plains).

macrophylla Sarg. in Rep. Missouri Bot. Gard. XIX. 104 (1908).—**Molles.**—Missouri (type locality: Carondelet).

macropoda Sargent in Rep. Missouri Bot. Gard. XIX. 80 (1908).—**Punctatae.**—Missouri, Kansas, Arkansas (type locality: Webb City, Mo.).

macrosperma Ashe in Jour. Elisha Mitchell Sci. Soc. XVI. 73 (1900).—**Tenuifoliae.**—North Carolina and West Virginia to Georgia and Tennessee (type locality: Lookout Mountain, Tenn.).

macrosperma var. *acutiloba* (Sarg.) Eggleston in Rhodora, X. 80 (1908) = C. acutiloba.

macrosperma var. *demissa* (Sarg.) Eggleston in Rhodora, X. 80 (1908) = C. demissa.

macrosperma var. *matura* (Sarg.) Eggleston in Rhodora, X. 80 (1908) = C. matura.

macrosperma var. *pastorum* (Sarg.) Eggleston in Rhodora, X. 80 (1908) = C. pastorum.

CRATAEGUS

macrosperma var. *pentandra* (Sarg.) Eggleston in Rhodora, x. 80 (1908) = C. pentandra.

macrosperma × pruinosa Eggleston in N. Y. State Mus. Bull. CCXLIII–IV. 64 (1923). (?)

macrosperma × punctata Eggleston in N. Y. State Mus. Bull. CCXLIII–IV. 64 (1923). (?)

magniflora Sargent in Bot. Gaz. XXXV. 383 (1903).—**Coccineae.**—Ontario, Northern Illinois (type locality: Glendon Park, near Chicago, Ill.).

magnifolia Sargent, Trees and Shrubs, II. 69 (1908).—**Pruinosae.**—Missouri (type locality: Webb City).

Maineana Sargent in Proc. Rochester Acad. Sci. IV. 106 (1903).—**Silvicolae.**—New York (type locality: Rochester).

maligna Sargent in N. Y. State Mus. Bull. CLXVII. 111 (1913).—**Rotundifoliae.**—New York (type locality: Ogdensburg).

maloides Sargent, Trees and Shrubs, I. 9 (1902) = C. aestivalis var. maloides Sarg.

mansfieldensis Sargent in Jour. Arnold Arb. IV. 103 (1923).—**Rotundifoliae.**—Ohio (type locality: Mansfield).

marcida Ashe in Jour. Elisha Mitchell Sci. Soc. XX. 53 (1904).—**Tenuifoliae.**—Ohio (type locality not given).

Margaretta Ashe in Jour. Elisha Mitchell Sci. Soc. XVI. 72 (1900).—**Rotundifoliae.**—Ontario and West Virginia, west to Ohio, Iowa and Missouri (type locality: St. Louis County, Mo.).

Margaretta var. Brownii (Britton) Sargent in Jour. Arnold Arb. III. 199 (1922).—Pennsylvania, Virginia and West Virginia, west to Ohio, Indiana and Missouri (type locality of *C. Brownii:* Buchanan, Va.).

Margaretta f. xanthocarpa Sargent in Jour. Arnold Arb. III. 200 (1922).—Iowa (type locality: Steamboat Rock).

Maribella Sargent in N. Y. State Mus. Bull. CLXVII. 109 (1913).—**Rotundifoliae.**—New York (type locality: Little Falls).

mariettensis Sargent in Jour. Arnold Arb. III. 194 (1922).—**Pruinosae.**—Ohio (type locality: Marietta).

Marshallii Eggleston in Rhodora, X. 79 (1908) = C. apiifolia Michx.

matura Sargent in Rhodora, III. 24 (1901); V. 144 (1903).—**Tenuifoliae.**—Southeastern Canada, New England, New York, Michigan (type locality: Middlebury, Vt.).

McGeeae Ashe in Jour. Elisha Mitchell Sci. Soc. XVIII. 20 (1902).—Group?—Iowa (type locality: "southeastern Iowa"). (?)

media Sargent in Rhodora, V. 150 (1903).—**Tenuifoliae.**—Connecticut (type locality: Oxford).

medioxima Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 190 (1910).—**Silvicolae.**—Pennsylvania, Ohio (type locality: between Carnot and Stoope's Ferry, Pa.).

CRATAEGUS

meiophylla Sargent in Jour. Arnold Arb. III. 198 (1922).—**Rotundifoliae.**—Ohio (type locality: Mt. Victory).

mellita Sargent in N. Y. State Mus. Bull. CV. Bot. IX. 58 (1906).—**Tenuifoliae.**—New York (type locality: Sandlake).

membranacea Sargent in Rhodora, V. 186 (1903).—**Macracanthae.**—Vermont (type locality: Middlebury).

menandiana Sargent in N. Y. State Mus. Bull. CV. Bot. IX. 68 (1906).—**Macracanthae.**—New York (type locality: golf grounds, Menands).

mendosa Beadle in Biltmore Bot. Studies, I. 65 (1902).—**Intricatae.**—Alabama (type locality: Albertville).

mercerensis Sargent in Jour. Arnold Arb. III. 193 (1922).—**Rotundifoliae.**—West Virginia (type locality: Mercer Springs).

meridiana Beadle in Biltmore Bot. Studies, I. 115 (1902).—**Flavae.**—Alabama (type locality: Ozark).

meridionalis Sargent in Jour. Arnold Arb. I. 252 (1920).—**Molles.**—Alabama, Mississippi (type locality: Gallion, Ala.).

merita Sargent in Rep. Geol. Surv. Mich. 1906, 540 (1907).—**Tenuifoliae.**—Michigan (type locality: Grand Rapids).

mespilifolia Hort. ex Nicholson in Hand-list Arb. Kew, pt. 1, 203 (1894) as synonym of C. mollis Scheele.

meticulosa Sargent, Trees and Shrubs, II. 243 (1913).—**Intricatae.**—Michigan, Indiana (type locality: Grand Rapids, Mich.).

mexicana Mociño & Sessé apud DeCandolle, Prodr. II. 629 (1825).—Group?—Mexico (type region: "Nova Hispana").

mexicana var. microsperma Eggleston in Bull. Torrey Bot. Club, XXXVI. 508 (1909).—Mexico (type locality: Guadalajara, Jalisco).

Michauxii Persoon, Syn. II. 38 (1807).—**Flavae.**—North Carolina, Georgia (type region: "Carol. Superior").

michiganensis Ashe in Bull. N. Car. Exper. Sta. CLXXV. 111 (1900).—**Macracanthae.**—Michigan (type locality not given).

micracantha Sargent, Trees and Shrubs, I. 69 (1902).—**Virides.**—Arkansas (type locality: Fulton).

micrantha Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 658 (1905).—**Macracanthae.**—Pennsylvania (type locality: Sellersville).

microcarpa Lindley in Bot. Reg. XXII. t. 1846 (1836) = C. spathulata Michx.

microsperma Sargent in Ontario Nat. Sci. Bull. IV. 82 (1908).—**Macracanthae.**—Southeastern Canada, New York (type locality: Toronto, Ont.).

Milleri Sargent in Jour. Arnold Arb. IV. 101 (1923).—**Pruinosae.**—Pennsylvania (type locality: Erie).

miniata Ashe in Jour. Elisha Mitchell Sci. Soc. XX. 51 (1904).—**Tenuifoliae.**—Pennsylvania, Ohio (type locality: Berks County, Pa.).

CRATAEGUS

minutiflora Sargent in Ontario Nat. Sci. Bull. IV. 54 (1908).—**Intricatae.**—Ontario, New York (type locality: Toronto, Ont.).

mira Beadle in Biltmore Bot. Studies, I. 78 (1902).—**Flavae.**—Georgia (type locality: Marietta).

miranda Sargent in Rep. Geol. Surv. Mich. 1906, 547 (1907).—**Coccineae.**—Ontario, Michigan, Ohio (type locality: Sarnia, Ont.).

misella Sargent in N. Y. State Mus. Bull. CLXVII. 115 (1913).—**Anomalae.**—New York (type locality: Belfast).

missouriensis Ashe in Bull. N. Car. Exper. Sta. CLXXV. 110 (1900).—**Macracanthae?**—Tennessee, Missouri (type locality: Monteer, Mo.).

mitis Sargent, Man. Trees N. Am. 407 (1905).—**Virides.**—Illinois (type locality: Cahokia).

modesta Sargent in Rhodora, III. 28 (1901).—**Intricatae.**—New England, New York, Pennsylvania (type locality: West Rutland, Vt.).

modica Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 624 (1905).—**Tenuifoliae.**—Pennsylvania (type locality: Sellersville).

Mohrii Beadle in Bot. Gaz. XXVIII. 416 (1899).—**Crus-galli.**—Georgia and Alabama, west to Kentucky, Tennessee and Arkansas (type locality: Birmingham, Ala.).

mollicula Sargent, Trees and Shrubs, II. 13 (1907).—**Macracanthae.**—Missouri, Arkansas (type locality: Monteer, Mo.).

mollipes Sargent in Rep. Geol. Surv. Mich. 1906, 545 (1907).—**Molles.**—Michigan, Indiana (type locality: Grand Rapids, Mich.).

mollis (Torr. & Gray) Scheele in Linnaea, XXI. 569 (1848).—**Molles.**—Ontario and Michigan west to Minnesota and Nebraska, south to Tennessee, Missouri and eastern Kansas (type region: "in civitate Illinoensi Americae borealis").

mollis var. *champlainensis* (Sarg.) Cowles in Am. Nat. XLII. 269 (1908) = C. champlainensis.

mollis var. *Ellwangeriana* (Sarg.) Cowles in Am. Nat. XLII. 269 (1908) = C. Ellwangeriana.

mollis var. *sera* (Sarg.) Eggleston in Rhodora, X. 82 (1908) = C. sera.

mollis var. *tiliaefolia* (K. Koch) Koehne, Deutsche Dendr. 232 (1893) = C. mollis Scheele.

mollita Sargent, Trees and Shrubs, II. 77 (1908).—**Macracanthae.**—Missouri (type locality: Monteer).

monantha Sargent, Trees and Shrubs, II. 237 (1913).—**Aestivales?**—Florida (type locality: Seville).

monosperma Sargent in Rep. Missouri Bot. Gard. XIX. 56 (1908).—**Crus-galli.**—Missouri (type locality: Swan).

monstrata Sargent in Rhodora, V. 146 (1903).—**Tenuifoliae.**—Massachusetts, Connecticut (type locality: Eight Mile Brook, Southbury and Middlebury, Ct.).

CRATAEGUS

montivaga Sargent in Jour. Arnold Arb. I. 247 (1920).—**Crus-galli.**—Texas (type locality: Spring Creek, near Boerne).

moselemensis Gruber in Bull. Torrey Bot. Club, XXXII. 391 (1905).—**Punctatae.**—Pennsylvania (type locality: Moselem). (?)

moselemensis var. corrugata Gruber in Bull. Torrey Bot. Club, XXXII. 391 (1905).—Pennsylvania (type locality: Charming Forge, Berks County). (?)

Moyeriana Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 618 (1905).—**Tenuifoliae.**—Pennsylvania (type locality: Sellersville).

multifida Ashe in Jour. Elisha Mitchell Sci. Soc. XX. 52 (1904).—**Tenuifoliae.**—Michigan (type locality: Port Huron). (?)

multipes Ashe in Bull. N. Car. Exper. Sta. CLXXV. 111 (1900).—Group?—Ohio (type locality not given). (?)

multispina Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. 7 (1900).—**Crus-galli.**—North Carolina (type locality: Round Knob, below Swannona Gap). (?)

munda Beadle in Biltmore Bot. Studies, I. 38 (1901).—**Flavae.**—South Carolina (type locality: Batesburg).

munita Sargent in Rep. Missouri Bot. Gard. XIX. 73 (1908).—**Crus-galli.**—Missouri, Kansas, Oklahoma (type locality: Webb City, Mo.).

nana (Dum.) Sweet, Hort. Brit. ed. 3, 209 (1839).—*Mespilus nana* Dumont de Courset, Bot. Cult. ed. 2, VII. 286 (1814) = C. crus-galli var. pyracanthifolia Ait.?

Napaea Sargent in Rhodora, VII. 203 (1905).—**Tenuifoliae.**—Connecticut (type locality: Litchfield).

napolitana Loddiges, Cat. 46 (1836), nomen nudum.—Loudon, Arb. Brit. II. 849 (1838), as synonym of *C.? coccinea* L.

Nelsonii Eggleston in Bull. Torrey Bot. Club, XXXVI. 512 (1909).—Group?—Mexico (type locality: San Cristobal, Chiapas). (?)

nemoralis Sargent in Bot. Gaz. XXXV. 104 (1903).—**Intricatae.**—Pennsylvania, Delaware (type locality: Rockford Park, Wilmington, Del.).

nemorosa Sargent in N. Y. State Mus. Bull. CL. 28 (1911).—**Pruinosae.**—New York (type locality: Painted Post).

neobaxteri Sargent in N. Y. State Mus. Bull. CXXII. 74 (1908).—**Rotundifoliae.**—New York (type locality: Tuscarora).

neobushii Sargent, Trees and Shrubs, II. 9 (1907).—**Intricatae.**—Illinois, Missouri (type locality: Monteer, Mo.).

neocanbyi Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 638 (1905).—**Intricatae.**—Pennsylvania (type locality: between Stroudsburg and Tannersville).

neofaxonii Sargent in Jour. Arnold Arb. VI. 2 (1925).—**Coccineae.**—Massachusetts (type locality of *C. ampla* Sarg., which this name replaces: Lanesboro.)

CRATAEGUS

neofluvialis Ashe in Jour. Elisha Mitchell Sci. Soc. XVI. 71 (1900).—**Macracanthae.**—North Carolina, Virginia, West Virginia, Indiana (type locality not given).

neolondinensis Sargent, Man. Trees N. Am. 443 (1905).—**Coccineae.**—Connecticut (type locality: New London).

neosmithii Sargent in Jour. Arnold Arb. VI. 2 (1925).—**Pruinosae.**—Pennsylvania (type locality of *C. ignava* Sarg., which this name replaces: Bedford Springs).

nescia Sargent in N. Y. State Mus. Bull. CXXII. 100 (1908).—**Tenuifoliae.**—New York (type locality: Coopers Plains).

nitens Sargent in Rep. Missouri Bot. Gard. XXII. 76 (1912).—**Virides.**—Missouri (type locality: Hannibal).

nitida (Engelm.) Sargent in Bot. Gaz. XXXI. 231 (1901).—**Virides.**—Illinois, Missouri, Arkansas (type locality not given).

nitidula Sargent in Rep. Geol. Surv. Mich. 1906, 521 (1907).—**Punctatae.**—Michigan (type locality: Port Huron).

noelensis Sargent in Jour. Arnold Arb. I. 253 (1920).—**Molles.**—Missouri, Arkansas (type locality: Noel, Mo.).

notabilis Sargent in N. Y. State Mus. Bull. CXXII. 32 (1908).—**Punctatae.**—New York (type locality: Buffalo).

× notha Sargent in Jour. Arnold Arb. III. 9 (1922).—(C. apiifolia × brachyphylla).—Arkansas (type locality: McNab, Hempstead County).

noveboracensis Sargent in N. Y. State Mus. Bull. CXVI. Bot. X. 22 (1907).—**Rotundifoliae.**—New York (type locality: North Elba).

nubicola Beadle in Biltmore Bot. Studies, I. 126 (1902).—**Tenuifoliae.**—North Carolina (type locality: Mt. Pisgah, Alexander County).

nuda Sargent in Jour. Arnold Arb. III. 10 (1922).—**Macracanthae.**—Missouri (type locality: Swan).

nudiflora Nuttall apud Torrey & Gray, Fl. N. Am. I. 468 (1840), as synonym of C. aestivalis T. & G.

numerosa Sargent in N. Y. State Mus. Bull. CXXII. 90 (1908).—**Pruinosae.**—New York (type locality: Coopers Plains).

nupera Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 17 (1903).—**Molles.**—Illinois (type locality: Joliet). (?)

nutans Sargent in Rep. Geol. Surv. Mich. 1906, 544 (1907).—**Molles.**—Michigan (type locality: Port Huron).

Oakesiana Eggleston in Torreya, VII. 35 (1907).—**Rotundifoliae.**—Vermont (type locality: Bloomfield).

obesa Ashe in Jour. Elisha Mitchell Sci. Soc. XX. 47 (1904).—**Macracanthae.**—Missouri (type locality: St. Louis County). (?)

oblita Sargent in N. Y. State Mus. Bull. CXXII. 40 (1908).—**Pruinosae.**—New York (type locality: Buffalo).

CRATAEGUS

oblongifolia Sargent in N. Y. State Mus. Bull. CV. Bot. IX. 60 (1906) = C. urbica Sarg.

obovatifolia Roemer, Fam. Nat. Syn. III. 120 (1847).—**Punctatae.**—(?)

obscura Sargent in Rep. Missouri Bot. Gard. XIX. 119 (1908).—**Macracanthae.**—Missouri, Arkansas (type locality: Webb City, Mo.).

obstipa Sargent in N. Y. State Mus. Bull. CLXVII. 80 (1913).—**Pruinosae.**—New York (type locality: Chapinville).

obtecta Ashe in Bot. Gaz. XXXIII. 233 (1902).—**Molles.**—Illinois (type locality not given). (?)

occidentalis Britton in Bull. N. Y. Bot. Gard. I. 448 (1900) = C. succulenta Schrad.?

ogdensburgensis Sargent in N. Y. State Mus. Bull. CLXVII. 123 (1913).—**Macracanthae.**—New York (type locality: Ogdensburg).

ohioensis Sargent in Jour. Arnold Arb. III. 183 (1922).—**Crus-galli.**—Ohio (type locality: Columbus).

olida Ashe in Jour. Elisha Mitchell Sci. Soc. XX. 56 (1904).—**Coccineae.**—Pennsylvania (type locality: Pyler Falls).

olivacea Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 153 (1910) = C. Fontanesiana Steud.

onusta Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 22 (1903).—**Pruinosae.**—Ohio (type locality: Mansfield).

opaca Hooker & Arnott in Comp. Bot. Mag. I. 25 (1835).—**Aestivales.**—Alabama, Mississippi, Louisiana, Texas (type locality not given).

operta Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 29 (1903).—**Crus-galli.**—North Carolina, Tennessee (type locality not given). (?)

opica Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 10 (1903).—**Macracanthae.**—Pennsylvania (type locality: Berks County).

opima Beadle in Biltmore Bot. Studies, I. 40 (1901).—**Pulcherrimae.**—Alabama, Florida (type locality: Greenville, Ala.).

opulens Sargent in Proc. Rochester Acad. Sci. IV. 104 (1903).—**Silvicolae.**—New York, Michigan (type locality: Rochester, N. Y.).

ornata Sargent in Proc. Rochester Acad. Sci. IV. 120 (1903).—**Tenuifoliae.**—Ontario, New York (type locality: Rochester, N. Y.).

otiosa Ashe in Jour. Elisha Mitchell Sci. Soc. XX. 48 (1904).—**Tenuifoliae.**—Michigan, Ohio (type locality: Summerville, Mich.).

ovalifolia Hornemann, Hort. Hafn. Suppl. 52 (1819), ex Sudworth, U. S. Dept. Agric. Div. For. XIV. 217 (1897), as synonym of *C. crus-galli prunellifolia* Sudw. = C. prunifolia Pers.?

ovata Sargent, Man. Trees N. Am. 402 (1905).—**Virides.**—Illinois, Missouri (type locality: Carondelet, Mo.).

ovatifolia Sargent in N. Y. State Mus. Bull. CXXII. 92 (1908).—**Pruinosae.**—New York (type locality: Coopers Plains).

CRATAEGUS

pachyphylla Sargent in Rep. Missouri Bot. Gard. XIX. 54 (1908).—**Crus-galli.**—Missouri (type locality: Osage).

pactilis Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 20 (1903).—**Tenuifoliae.**—Wisconsin (type locality: Milwaukee). (?)

Paddockeae Sargent in Rhodora, VII. 202 (1905).—**Tenuifoliae.**—Vermont (type locality: Lyndonville).

padifolia Sargent, Trees and Shrubs, II. 75 (1908).—**Intricatae.**—Missouri (type locality: Swan).

padifolia var. incarnata Sargent in Jour. Arnold Arb. VI. 4 (1925).—Missouri, Arkansas (type locality: Galena, Mo.).

pagensis Sargent in Jour. Arnold Arb. IV. 104 (1923).—**Intricatae.**—Oklahoma (type locality: Page).

Paineana Sargent in N. Y. State Mus. Bull. CLXVII. 97 (1913).—**Tenuifoliae.**—New York (type locality: Herkimer).

Painteriana Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 647 (1905).—**Intricatae.**—Pennsylvania (type locality: Newtown).

pallens Beadle in Biltmore Bot. Studies, I. 27 (1901).—**Intricatae.**—North Carolina (type locality: Biltmore).

pallescens Sargent in N. Y. State Mus. Bull. CLXVII. 81 (1913).—**Pruinosae.**—New York (type locality: Ogdensburg).

palliata Sargent, Trees and Shrubs, II. 236 (1913).—**Crus-galli.**—Missouri, Arkansas (type locality: Fulton, Ark.).

pallidula Sargent in Ontario Nat. Sci. Bull. IV. 36 (1908).—**Tenuifoliae.**—Ontario (type locality: Toronto).

Palmeri Sargent, Trees and Shrubs, I. 57 (1903).—**Crus-galli.**—Missouri, Kansas, Arkansas, Oklahoma (type locality: Webb City, Mo.).

paludosa Sargent, Trees and Shrubs, I. 15 (1902).—**Virides.**—Florida (type locality: Haw Creek, Volusia County).

palustris Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. 13 (1900).—Group?—Indiana (type locality: Freeport). (?)

panda Beadle in Biltmore Bot. Studies, I. 89 (1902).—**Flavae.**—Florida (type locality: Tallahassee).

panda Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 29 (1903).—Group?—North Carolina (type locality: Glendon). (?)

paradoxa Sargent in Rep. Missouri Bot. Gard. XXII. 68 (1912).—**Crus-galli.**—Missouri, Kansas, Arkansas (type locality: Joplin, Mo.).

parca Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 19 (1903).—**Tenuifoliae.**—Wisconsin (type locality: Milwaukee). (?)

parciflora Sargent in Rep. Missouri Bot. Gard. XIX. 60 (1908).—**Crus-galli.**—Missouri, Arkansas, Texas (type locality: Webb City, Mo.).

Parkae Sargent in Rep. Missouri Bot. Gard. XXII. 70 (1912).—**Crus-galli.**—Missouri (type locality: Springfield).

Parryana Eggleston in Bull. Torrey Bot. Club, XXXVI. 510 (1909).—Group?—Mexico (type locality: Alvarez, San Louis Potosi). (?)

CRATAEGUS

parviflora Sargent in Proc. Rochester Acad. Sci. IV. 117 (1903).—**Tenuifoliae.**—New York, Pennsylvania, Indiana (type locality: Rochester, N. Y.).

parvifolia Aiton, Hort. Kew. II. 169 (1789) = C. uniflora Muench.

parvifolia var. *florida* (Lodd.) Loudon, Arb. Brit. II. 842 (1838). (?)

parviflora var. *grossulariaefolia* (Lodd.) Loudon, Arb. Brit. II. 842 (1838).—(?)

parvula Sargent in Rep. Geol. Surv. Mich. 1906, 527 (1907).—**Pruinosae.**—Michigan (type locality: Port Huron).

pascens Ashe in Jour. Elisha Mitchell Sci. Soc. XVIII. 23 (1902).—**Rotundifoliae?**—Michigan, Wisconsin (type locality not given). (?)

pastorum Sargent in Rhodora, III. 24 (1901).—**Tenuifoliae.**—New Hampshire, Massachusetts, Connecticut (type locality: Lancaster, Mass.).

patrum Sargent in Rep. Missouri Bot. Gard. XIX. 95 (1908).—**Pruinosae.**—Iowa, Missouri, Arkansas (type locality: St. Louis, Mo.).

paucispina Sargent in Bot. Gaz. XXXV. 391 (1903).—**Tenuifoliae.**—Illinois (type locality: Maywood).

pausiaca Ashe in Ann. Carnegie Mus. I. 390 (1902).—**Punctatae.**—New York, Pennsylvania (type locality not given).

Pearsonii Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. 10 (1900).—**Flavae?**—North Carolina (type locality: King's Mountain). (?)

Pechiana Sargent in Rep. Missouri Bot. Gard. XXII. 78 (1912).—**Virides.**—Illinois, Missouri (type locality: Hannibal, Mo.).

Peckietta Sargent in Rhodora, VII. 174 (1905).—**Macracanthae.**—New York (type locality: Piseco).

Peckii Sargent in Rhodora, V. 63 (1903).—**Intricatae.**—New York (type locality: Lansingburg).

pedicellata Sargent in Bot. Gaz. XXXI. 226 (1901).—**Coccineae.**—Ontario, New York, Pennsylvania (type locality: Rochester, N. Y.).

pedicellata var. *Ellwangeriana* (Sarg.) Eggleston in Rhodora, X. 82 (1908) = C. Ellwangeriana.

pedicellata var. gloriosa Sargent in Jour. Arnold Arb. I. 254 (1920).—**Coccineae.**—New York (type locality: Rochester).

pelacris Sargent in N. Y. State Mus. Bull. CLXVII. 82 (1913).—**Pruinosae.**—New York (type locality: Olean).

pellecta Sargent in N. Y. State Mus. Bull. CXXII. 85 (1908).—**Pruinosae.**—New York (type locality: Coopers Plains).

pellucidula Sargent in Rhodora, VII. 179 (1905).—**Macracanthae.**—Connecticut (type locality: Litchfield).

penita Beadle in Biltmore Bot. Studies, I. 57 (1902).—**Virides.**—Tennessee (type locality: Chattanooga).

pennsylvanica Ashe in Ann. Carnegie Mus. I. 394 (1902).—**Molles.**—Pennsylvania (type locality: Berks County).

CRATAEGUS

Pennypackeri Sargent in Bot. Gaz. XXXV. 100 (1903).—**Crus-galli.**—Delaware (type locality: Stanton Station).

pentandra Sargent in Rhodora, III. 25 (1901).—**Tenuifoliae.**—Quebec, New England, New York (type locality: New Haven, Vt.).

pentaneura Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 12 (1903).—**Uniflorae.**—New Jersey, North Carolina (type locality not given). (?)

pentasperma Ashe in Bot. Gaz. XXXV. 436 (1903).—Group?—North Carolina (type locality: Franklin). (?)

peoriensis Sargent in Bot. Gaz. XXXI. 5 (1901).—**Crus-galli.**—Illinois (type locality: Princeville, Peoria County).

pequotorum Sargent in Rhodora, V. 55 (1903).—**Pruinosae.**—Connecticut (type locality: Mumford's Point, Groton).

peramoena Sargent in Ontario Nat. Sci. Bull. IV. 89 (1908).—**Macracanthae.**—Ontario (type locality: London).

perampla Sargent in Rep. Geol. Surv. Mich. 1906, 525 (1907).—**Pruinosae.**—Michigan (type locality: Port Huron).

perjucunda Sargent in Ontario Nat. Sci. Bull. IV. 27 (1908).—**Pruinosae.**—Ontario, New York (type locality: London, Ont.).

perlacta Sargent in Rep. Geol. Surv. Mich. 1906, 541 (1907).—**Tenuifoliae.**—Michigan (type locality: Grand Rapids).

perlevis Ashe in Jour. Elisha Mitchell Sci. Soc. XX. 48 (1904).—**Tenuifoliae.**—Pennsylvania (type locality: Kutztown).

permera Sargent in Rep. Missouri Bot. Gard. XIX. 65 (1908).—**Crus-galli.**—Missouri, Arkansas (type locality: Monteer, Mo.).

perrara Sargent in N. Y. State Mus. Bull. CLXVII. 103 (1913).—**Coccineae.**—New York (type locality: Chapinville).

persimilis Sargent in Proc. Rochester Acad. Sci. IV. 94 (1903).—**Crus-galli.**—New York (type locality: Rochester).

persistens Sargent, Trees and Shrubs, II. 233 (1913).—**Crus-galli.**—Known only in cultivation (type locality: Arnold Arboretum, from seed received from Museum d'Histoire Naturelle, Paris, of unknown origin).

perspicabilis Sargent in N. Y. State Mus. Bull. CLXVII. 90 (1913).—**Silvicolae.**—New York (type locality: Salamanca).

pertomentosa Ashe in Jour. Elisha Mitchell Sci. Soc. XVI. 70 (1900).—**Macracanthae.**—Missouri, Kansas (type locality: Johnson County, Kan.).

pexa Beadle in Biltmore Bot. Studies, I. 116 (1902).—**Flavae.**—North Carolina (type locality: Salisbury).

Phaenopyrum (L.f.) Medicus, Gesch. Bot. 83 (1793).—**Microcarpae.**—North Carolina, Tennessee, Kentucky, Illinois and Missouri (type locality not given).

CRATAEGUS

phaneroneura Sargent in Jour. Arnold Arb. III. 2 (1922).—**Crus-galli.**—Missouri (type locality: Clarksville).

philadelphica Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 588 (1905).—**Pruinosae.**—Pennsylvania (type locality: West Philadelphia).

phlebodia Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 155 (1910).—**Crus-galli.**—Pennsylvania (type locality: Bedford Springs).

picta Sargent in Ontario Nat. Sci. Bull. IV. 91 (1908).—**Macracanthae.**—Ontario (type locality: Toronto).

pilifera Sargent in Rep. Missouri Bot. Gard. XIX. 64 (1908).—**Crus-galli.**—Illinois, Missouri, Arkansas (type locality: Swan, Mo.).

pilosa Sargent in Rhodora, V. 56 (1903).—**Pruinosae.**—Massachusetts (type locality: Lancaster).

pinetorum Beadle in Bot. Gaz. XXX. 343 (1900).—**Pulcherrimae.**—Alabama (type locality: Albertsville).

pinguis Sargent in Rep. Geol. Surv. Mich. 1906, 559 (1907).—**Anomalae.**—Michigan (type locality: Lowell, Kent County).

Pinshow Hort. ex Nicholson in Hand-list Arb. Kew, pt. 1. 211 (1894), as synonym of C. uniflora Muench.

Piperi Britton in Torreya, I. 55 (1901).—**Douglasianae.**—Washington, Oregon, Idaho (type locality: Pullman, Wash.).

pisifera Sargent in Rhodora, VII. 163 (1905).—**Macracanthae.**—Ontario, Vermont, Massachusetts (type locality: Cornwall, Vt.).

placens Sargent, Trees and Shrubs, II. 243 (1913).—**Molles.**—Ontario, Michigan (type locality: Walpole Island, Lamberton County, Ont.).

placiva Sargent in Ontario Nat. Sci. Bull. IV. 22 (1908).—**Pruinosae.**—Ontario, New York, Michigan (type locality: Buffalo, N. Y.).

plana Sargent in N. Y. State Mus. Bull. CXXII. 45 (1908).—**Pruinosae.**—New York (type locality: Buffalo).

platycarpa Sargent in Rep. Missouri Bot. Gard. XIX. 92 (1908).—**Pruinosae.**—Illinois, Missouri, Arkansas (type locality: Moark, Ark.).

poliophylla Sargent in Jour. Arnold Arb. III. 185 (1922).—**Virides.**—Texas (type locality: Columbia).

polita Sargent in Rhodora, V. 111 (1903).—**Coccineae.**—Massachusetts, Connecticut, New York (type locality: East Lyme, Ct.).

polita var. *Tatnalliana* (Sarg.) Eggleston in Rhodora, X. 82 (1908) = C. Tatnalliana.

polybracteata Ashe in Jour. Elisha Mitchell Sci. Soc. XVI. 79 (1900).—**Rotundifoliae.**—New York, Ohio (type locality: Sugar Grove, O.).

polyclada Sargent in Rep. Missouri Bot. Gard. XXII. 72 (1912).—**Crus-galli.**—Missouri (type locality: Springfield).

populifolia Walter, Fl. Car. 147 (1788) = C. Phaenopyrum Medic.

populnea Ashe in Ann. Carnegie Mus. I. 395 (1902).—**Tenuifoliae.**—Pennsylvania (type locality: Berks County).

CRATAEGUS

porracea Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. pt. 2, 19 (1901).—**Tenuifoliae.**—Pennsylvania, New York (type locality: Susquehanna, Pa.). (?)

porrecta Ashe in Ann. Carnegie Mus. I. 391 (1902).—**Punctatae.**—Pennsylvania (type locality: Pittsburgh).

Porteri Britton in Bull. N. Y. Bot. Gard. I. 448 (1900).—**Pruinosae.**—Pennsylvania (type locality: Tannersville).

praeclara Sargent in Ontario Nat. Sci. Bull. IV. 97 (1908).—**Macracanthae.**—Ontario (type locality: Toronto).

praecoqua Sargent in Rhodora, V. 167 (1903).—**Rotundifoliae.**—Quebec, northern New England and New York, west to Wisconsin and northern Illinois (type locality: Crown Point, N. Y.).

praecox Sargent in Rhodora, III. 27 (1901) = C. praecoqua Sarg.

praestans Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 163 (1910).—**Punctatae.**—Pennsylvania (type locality: Nine Mile Run, near Pittsburgh).

praetermissa Sargent in Rhodora, VII. 213 (1905).—**Rotundifoliae.**—Vermont (type locality: Ferrisburg).

pratensis Sargent in Bot. Gaz. XXXI. 6 (1901).—**Punctatae.**—Illinois (type locality: Wady Petra).

premora Ashe in Ann. Carnegie Mus. I. 391 (1902)—**Intricatae.**—Pennsylvana (type locality: eastern part of Berks County).

Pringlei Sargent in Rhodora, III. 21 (1901).—**Coccineae.**—Ontario, New England, New York, Wisconsin, northern Illinois and Ohio (type locality: Charlotte, Vt.).

Pringlei var. *exclusa* (Sarg.) Eggleston in Rhodora, X. 82 (1908) = C. exclusa.

Pringlei var. *lobulata* (Sarg.) Eggleston in Rhodora, X. 82 (1908) = C. lobulata.

prinoides Sargent in Ontario Nat. Sci. Bull. IV. 81 (1908).—**Macracanthae.**—Ontario (type locality: Sarnia).

prismatica Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. pt. 2, 15 (1901).—Group?—North Carolina (type locality: Madison County). (?)

priva Ashe in Bull. Charleston Mus. XII. 42 (1916).—Group?—South Carolina (type locality: "south end of Piedmont"). (?)

procax Ashe in Bull. Charleston Mus. XII. 42 (1916).—**Crus-galli.**—South Carolina (type locality not given).

procera Sargent, Trees and Shrubs, II. 71 (1908).—**Pruinosae.**—New York, Pennsylvania (type locality: Hemlock, N. Y.).

Proctoriana Sargent in N. Y. State Mus. Bull. CLXVII. 110 (1913).—**Rotundifoliae.**—New York (type locality: Utica).

prominens Sargent in Ontario Nat. Sci. Bull. IV. 23 (1908).—**Pruinosae.**—Ontario, New York (type locality: Toronto, Ont.).

CRATAEGUS

promissa Sargent in N. Y. State Mus. Bull. CXXII. 50 (1908).—**Silvicolae.**—Ontario, New York, Vermont, Michigan (type locality: Niagara Falls, N. Y.).

prona Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 17 (1903).—**Silvicolae.**—Michigan, Ohio (type locality: Port Huron, Mich.).

propensa Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 214 (1910).—**Tenuifoliae.**—Pennsylvania (type locality: Keyser Valley, Scranton).

propinqua Ashe in Jour Elisha Mitchell Sci. Soc. XX. 53 (1904).—**Tenuifoliae.**—Ohio (type locality: Milan).

propixa Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 248 (1910).—**Macracanthae.**—Pennsylvania (type locality: Scranton).

propria Sargent in Rhodora, VII. 214 (1905).—**Rotundifoliae.**—Massachusetts (type locality: South Lancaster).

pruinosa (Wendl.) K. Koch, Hort. Dendr. 168 (1853).—**Pruinosae.**—Ontario, New England and New York, south to Delaware, west to New York, Ohio, Indiana and northern Illinois (type locality of *Mespilus pruinosa* Wendland not given).

pruinosa var. *conjuncta* (Sarg.) Eggleston in Rhodora, X. 81 (1908) = C. conjuncta.

pruinosa f. *dissona* (Sarg.) Eggleston in Rhodora, X. 81 (1908) = C. dissona.

pruinosa var. *latisepala* (Ashe) Eggleston in Rhodora, X. 81 (1908) = C. latisepala.

pruinosa var. *philadelphica* (Sarg.) Eggleston in Rhodora, X. 81 (1908) = C. philadelphica.

pruinosa var. *Porteri* (Britton) Eggleston in Rhodora, X. 81 (1908) = C. Porteri.

pruinosa × punctata Eggleston in N. Y. State Mus. Bull. CCXLIII–IV. 64 (1923). (?)

pruinosa × straminea Eggleston in N. Y. State Mus. Bull. CCLIV. 422 (1924). (?)

prunellifolia Bosc in DeCandolle, Prodr. II. 627 (1825) = C. prunifolia Pers. ?

prunifolia (Marsh.) Persoon, Syn. II. 37 (1807).—**Macracanthae?**—Known only in cultivation.

prunifolia var. *ingestria* (Lodd.) Loudon, Arb. Brit. II. 821 (1838) = C. prunifolia Pers. (?)

puberis Sargent in N. Y. State Mus. Bull. CXXII. 73 (1908).—**Rotundifoliae.**—New York (type locality: Belfast).

pubescens (H.B.K.) Steudel, Nomencl. Bot. ed. 2, 433 (1841).—Mexico (type locality: Real de Moran, Hidalgo).

pubescens var. Botterii Eggleston in Bull. Torrey Bot. Club, XXXVI. 506 (1909).—Mexico (type locality: Orizaba). (?)

pubescens f. Humboldtii Stapf in Kew Bull. Misc. Inform. 1914, 8, 293 (1914).—Mexico (type region: San Luis Potosi to Federal Dist.). (?)

CRATAEGUS

pubescens f. stipulacea (Lodd.) Stapf in Kew Bull. Misc. Inform. 1914, 8, 293 (1914).—Mexico (type region: Federal District).

pubifolia Ashe in Bull. N. Car. Exper. Sta. CLXXV. 114 (1900).—**Macracanthae.**—Michigan, Indiana, Iowa (type locality: "Middle Iowa").

pubipes Ashe in Bull. N. Car. Exper. Sta. CLXXV. 114 (1900).—**Macracanthae.**—Minnesota (type locality: "northeastern Minnesota").

pudens Sargent in Rep. Missouri Bot. Gard. XIX. 122 (1908).—**Macracanthae.**—Missouri (type locality: Monteer).

pulcherrima Ashe in Jour. Elisha Mitchell Sci. Soc. XVI. 77 (1900).—**Pulcherrimae.**—Florida, Georgia (type locality not given).

pulchra Sargent in N. Y. State Mus. Bull. CXXII. 42 (1908).—**Pruinosae.**—New York, Pennsylvania (type locality: Niagara Falls, N. Y.).

pulla Beadle in Biltmore Bot. Studies, I. 96 (1902).—**Flavae.**—Mississippi (type locality: Columbus). (?)

pumila Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 612 (1905).—**Tenuifoliae.**—Pennsylvania (type locality: Sellersville).

punctata Jacquin, Hort. Vind. I. 10 (1770).—**Punctatae.**—Southeastern Canada, New England and New York, south to North Carolina and Georgia, west to Minnesota, Iowa, Kentucky and Tennessee (type locality: cultivated in Botanical Garden, Vienna).

punctata var. aurea Aiton, Hort. Kew. II. 170 (1789).—Ontario, New York, Pennsylvania, Ohio (type locality: Inverary Castle, Scotland ? "Cultivated 1746 by Archibald, Duke of Argyle").

punctata β. brevispina (Douglas) Hooker, Fl. Bor. Am. I. 201 (1834), nomen nudum = C. Douglasii Lindl.

punctata var. canescens Britton in Bull. Torrey Bot. Club. XXI. 231 (1894).—Pennsylvania (type locality: Easton).

punctata lobata Hort. ex Zabel in Beissner Schelle & Zabel, Handb. Laubholz-Ben. 171 (1903), nomen nudum.

punctata var. microphylla Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 159 (1910).—Pennsylvania (type locality: Linesville).

punctata var. mutabilis Gruber in Bull. Torrey Bot. Club, XXXII. 390 (1905).—Pennsylvania (type locality: Kutztown). (?)

punctata var. *rubra* Aiton, Hort. Kew. II. 170 (1789) = C. punctata Jacq.

punctata var. *xanthocarpa* (Medic.) Lavallée, Arb. Segrez. I. 53 (1880) = C. punctata var. aurea Ait.

punctata × succulenta Eggleston in N. Y. State Mus. Bull. CCXLIII–IV. 63 (1923). (?)

pura Sargent in Rep. Geol. Surv. Mich. 1906, 549 (1907).—**Coccineae.**—Michigan (type locality: Grand Rapids).

pusilla Sargent in Rep. Geol. Surv. Mich. 1906, 553 (1907).—**Intricatae.**—Michigan (type locality: Grand Rapids).

CRATAEGUS

puta Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 192 (1910).—**Silvicolae.**—Pennsylvania (type locality: Scranton).

putata Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 244 (1910).—**Anomalae.**—Pennsylvania (type locality: Virginia, near Scranton).

Putnamiana Sargent in Jour. Arnold Arb. IV. 102 (1923).—**Coccineae.**—Ohio (type locality: Marietta).

pygmaea Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 650 (1905).—**Intricatae.**—Pennsylvania (type locality: Sellersville).

pyracanthifolia (Ait.) Sweet, Hort. Brit. ed. 3. 209 (1839) = C. crus-galli var. pyracanthifolia.

pyracanthoides Beadle in Biltmore Bot. Studies, I. 136 (1902).—**Crus-galli.**—Florida (type locality: Marianna).

pyramidata Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 196 (1910).—**Silvicolae.**—Pennsylvania (type locality: Scranton).

pyrifolia Aiton, Hort. Kew. II. 168 (1789).—**Macracanthae** = C. tomentosa L. ?

pyrifolia β. aurantiaca Lange, Rev. Gen. Crat. 82 (1897).—**Macracanthae.**—(?)

pyrifolia var. *sylvestris* Schuette in Proc. Biol. Soc. Washington. XVI. 96 (1903).—Group?—Northwestern Wisconsin. (?)

pyriformis Britton in Bull. N. Y. Bot. Gard. I. 449 (1900) = C. dispessa Ashe.

quaesita Beadle in Biltmore Bot. Studies, I. 33 (1901).—**Flavae.**—Florida (type locality: River Junction). (?)

quercina Ashe in Jour. Elisha Mitchell Sci. Soc. XVIII. 27 (1902).—**Molles.**—Texas (type locality of *C. columbiana* Sarg., which this name replaces: Columbia).

quinebaugensis Sargent in Rhodora, VII. 194 (1905).—**Pruinosae.**—Connecticut (type locality: Hopeville).

radians Sargent in N. Y. State Mus. Bull. CXXII. 64 (1908).—**Molles.**—New York (type locality: Rochester).

radiata Loddiges, Cat. 39 (1826).—Loudon, Arb. Brit. 819 (1838) as a synonym of *C. pyrifolia* Ait.

radiata Sargent in N. Y. State Mus. Bull. CXXII. 42 (1908).—**Pruinosae.**—Ontario, New York (type locality: Buffalo, N. Y.).

radina Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 203 (1910).—**Silvicolae.**—Pennsylvania (type locality: Schenley Park, Pittsburgh).

radiosa Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 657 (1905).—**Macracanthae.**—Pennsylvania (type locality: Upper Darby, Delaware County).

raleighensis Ashe in Bull. N. Car. Exper. Sta. CLXXV. 112 (1900).—**Uniflorae.**—North Carolina (type locality: Raleigh).

CRATAEGUS

ramosa Sargent in N. Y. State Mus. Bull. CXXII. 86 (1908).—**Pruinosae.**—New York (type locality: Coopers Plains).

Randiana Sargent in Rhodora, v. 142 (1903).—**Tenuifoliae.**—Nova Scotia, Maine (type locality: Bar Harbor, Me.).

rara Sargent, Trees and Shrubs, II. 241 (1913).—**Pruinosae.**—Connecticut (type locality: Hopeville).

rava Beadle in Biltmore Bot. Studies, I. 91 (1902).—**Flavae.**—Florida (type locality: Tallahassee).

Ravenelii Sargent in Bot. Gaz. XXXIII. 122 (1902).—**Flavae.**—South Carolina, Georgia (type locality: Augusta, Ga.).

ravida Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. pt. 2, 6 (1901).—Group?—Tennessee (type locality: Clarkton). (?)

recedens Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 161 (1910).—**Punctatae.**—Pennsylvania (type locality: Kutztown).

recordabilis Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 199 (1910).—**Silvicolae.**—Pennsylvania (type locality: Kittanning).

recta Sargent in N. Y. State Mus. Bull. CXXII. 97 (1908).—**Tenuifoliae.**—New York (type locality: Coopers Plains).

recurva Beadle in Biltmore Bot. Studies, I. 106 (1902).—**Flavae.**—Florida (type locality: Ocala).

redolens Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 14 (1903).—**Molles.**—Iowa, Wisconsin, Minnesota (type locality not given). (?)

regalis Beadle in Biltmore Bot. Studies, I. 134 (1902).—**Crus-galli.**—Georgia, Alabama, Mississippi, Arkansas (type locality: Rome, Ga.).

relicta Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 177 (1910).—**Pruinosae.**—Pennsylvania, Ohio (type locality: Orbisonia, Pa.).

remota Sargent, Trees and Shrubs, II. 241 (1913).—**Pruinosae.**—Michigan (type locality: Grand Rapids).

repentina Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 226 (1910).—**Rotundifoliae.**—Pennsylvania, Ohio (type locality: Bedford, Pa.).

repulsans Sargent in N. Y. State Mus. Bull. CXXII. 107 (1908).—**Anomalae.**—New York (type locality: Coopers Plains).

resecta Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 23 (1903).—**Intricatae.**—North Carolina (type locality: Marion). (?)

reses Ashe in Jour. Elisha Mitchell Sci. Soc. XX. 55 (1904).—**Intricatae.**—Pennsylvania (type locality: Berks County).

resima Beadle in Biltmore Bot. Studies, I. 110 (1902).—**Flavae.**—Georgia (type locality: Albany).

retrusa Ashe in Jour. Elisha Mitchell Sci. Soc. XX. 49 (1904).—**Tenuifoliae.**—Michigan (type locality: Summerville).

Reverchonii Sargent, Trees and Shrubs, I. 55 (1903).—**Crus-galli.**—Texas (type locality: Dallas).

CRATAEGUS

rhodella Ashe in Jour. Elisha Mitchell Sci. Soc. XVIII. 19 (1902).—**Uniflorae.**—North Carolina, Tennessee (type locality: Franklin, N. Car.).

rhombifolia Sargent in Rhodora, v. 183 (1903).—**Macracanthae.**—Canada, New England, New York (type locality: Trading Cove, Norwich, Ct.).

Ridgwayi Sargent in Jour. Arnold Arb. VI. 2 (1925).—**Molles.**—Southern Illinois (type locality: Olney).

rigens Beadle in Biltmore Bot. Studies, I. 54 (1902).—**Punctatae.**—Georgia, Alabama, Tennessee (type locality: Gadsden, Ala.).

rigida Sargent in Rep. Missouri Bot. Gard. XIX. 99 (1908).—**Pruinosae.**—Missouri (type locality: Pacific).

rimosa Beadle in Biltmore Bot. Studies, I. 107 (1902).—**Flavae.**—Florida (type locality: Citra).

riparia Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. 11 (1900).—**Silvicolae.**—North Carolina (type locality: Swain County).

rivalis Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 580 (1905).—**Crus-galli.**—Pennsylvania, Ohio (type locality: Sellersville, Pa.).

rivularis Nuttall apud Torrey & Gray, Fl. N. Am. I. 464 (1840).—**Douglasianae.**—Idaho, Wyoming, Colorado, Utah, Nevada (type locality: "Oregon, along rivulets in the Rocky Mountains").

roanensis Ashe in Bull. N. Car. Exper. Sta. CLXXV. 114 (1900).—**Tenuifoliae.**—Virginia, North Carolina, West Virginia, Tennessee (type locality: Roan Mountain, N. Car.).

Robbinsiana Sargent in Rhodora, VII. 197 (1905) = C. diffusa Sarg.

Robesoniana Sargent in Rhodora, v. 110 (1903).—**Molles.**—Ontario, Massachusetts, New York, Pennsylvania (type locality: Lenox, Mass.).

Robinsonii Sargent in Rhodora, v. 184 (1903).—**Macracanthae.**—Nova Scotia (type locality: Lock Broom, near Pictou).

robur Beadle in Biltmore Bot. Studies, I. 69 (1902).—**Pulcherrimae.**—Florida (type locality: Tallahassee).

robusta Sargent in N. Y. State Mus. Bull. CXXII. 28 (1908).—**Crus-galli.**—New York (type locality: Niagara Falls).

roribacca Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. 4 (1900).—Group?—North Carolina (type locality: "Oconaluftee River, in the mountains of North Carolina"). (?)

Rosei Eggleston in Bull. Torr. Bot. Club, XXXVI. 509 (1909).—Mexico (type locality: Alvarez, San Luis Potosi).

rotunda Sargent in Rep. Missouri Bot. Gard. XIX. 59 (1908).—**Crus-galli.**—Missouri (type locality: Webb City).

rotundata Sargent in Ontario Nat. Sci. Bull. IV. 61 (1908).—**Rotundifoliae.**—Ontario (type locality: London).

CRATAEGUS

rotundifolia Moench, Bäume Weiss. 29 (1785).—**Rotundifoliae.**—Nova Scotia and New England, west to New York, Pennsylvania, Michigan and Saskatchewan (type locality not given).

rotundifolia var. aboriginum Sargent in Jour. Arnold Arb. III. 196 (1922).—Quebec (type locality: Caughnawaga).

rotundifolia var. *Bicknellii* Eggleston in Rhodora, x. 79 (1908) = C. Bicknellii.

rotundifolia var. *chrysocarpa* (Ashe) Eggleston in Rhodora, x. 79 (1908) = C. chrysocarpa.

rotundifolia var. *Faxoni* (Sarg.) Eggleston in Rhodora, x. 79 (1908) = C. Faxonii.

rotundifolia a. minor Dippel, Handb. Laubholzk. III. 440 (1893). (?)

rotundifolia var. pubera Sargent in Rhodora XI. 183 (1909).—Southeastern Canada, New England and New York, west to Wisconsin and Minnesota (type locality not given).

rotundifolia f. rubescens Sargent in Jour. Arnold Arb. III. 197 (1922).—Quebec (type locality: St. Anne, Montreal Island).

rotundifolia b. *succulenta* (Schrad.) Dippel, Handb. Laubholzk. III. 441 (1893) = C. succulenta.

rubella Beadle in Bot. Gaz. XXX. 344 (1900).—**Intricatae.**—Virginia, West Virginia, North Carolina, Alabama and Tennessee (type locality: Valleyhead, Ala.).

rubescens Ashe in Bull. N. Car. Exper. Sta. CLXXV. 111 (1900).—**Intricatae.**—Alabama (type locality: Auburn). (?)

rubicunda Sargent in Proc. Rochester Acad. Sci. IV. 121 (1903).—**Tenuifoliae.**—Ontario, New York, Ohio (type locality: Rochester, N. Y.).

rubicundula Sargent, Trees and Shrubs, II. 7 (1907).—**Pruinosae.**—Missouri (type locality: Carondelet).

rubrifolia Sargent in Rep. Missouri Bot. Gard. XIX. 66 (1908).—**Crus-galli.**—Missouri, Kansas (type locality: Webb City, Mo.).

rubrisepala Sargent in Rep. Missouri Bot. Gard. XIX. 70 (1908).—**Crus-galli.**—Missouri (type locality: Joplin).

rubrocarnea Sargent in N. Y. State Mus. Bull. CV. Bot. IX. 55 (1906).—**Tenuifoliae.**—New York (type locality: North Albany).

rubro-lutea Sargent in N. Y. State Mus. Bull. CXXII. 88 (1908).—**Pruinosae**—New York (type locality: Coopers Plains).

rudis Sargent in Rep. Missouri Bot. Gard. XIX. 71 (1908).—**Crus-galli.**—Missouri (type locality: Monteer).

rufipes Ashe in Jour. Elisha Mitchell Sci. Soc. XX. 51 (1904).—**Tenuifoliae.**—Pennsylvania (type locality: Berks County).

rufula Sargent in Jour. Arnold Arb. I. 251 (1920).—**Aestivales.**—North Carolina, Florida, Georgia, Alabama (type locality not given).

CRATAEGUS

rugosa Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. V. (1900).—Group?—North Carolina (type locality not given). (?)

rupestris Ashe in Jour. Elisha Mitchell Sci. Soc. XVIII. 27 (1902) = C. densiflora Sarg.*

rupicola Sargent in Rep. Missouri Bot. Gard. XIX. 121 (1908).—**Macracanthae.**—Missouri (type locality: Swan).

ruricola Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 206 (1910).—**Silvicolae.**—Pennsylvania (type locality: Chadsford.)

russata Sargent in N. Y. State Mus. Bull. CLXVII. 85 (1913).—**Pruinosae.**—New York (type locality: Painted Post, Steuben County).

rustica Beadle in Biltmore Bot. Studies, I. 122 (1902).—**Pruinosae.**—North Carolina, West Virginia (type locality: Biltmore, N. Car.).

Ruthiana Sargent in Acad. Nat. Sci. Phila. LVII. 591 (1905).—**Pruinosae.**—Pennsylvania (type locality: Durham).

rutila Sargent in Bot. Gaz. XXXV. 399 (1903).—**Macracanthae.**—Ohio, Indiana, Wisconsin, Illinois (type locality: Chicago Heights, Ill.).

saeva Sargent in Ontario Nat. Sci. Bull. IV. 94 (1908).—**Macracanthae.**—Ontario (type locality: Toronto).

salicifolia Medicus, Bot. Beob. II. 345 (1782) = C. crus-galli var. pyracanthifolia Ait.?

salicifolia var. *Buistii* (Koch) Lange, Rev. Gen. Crat. 63 (1897), as synonym of C. Fontanesiana a. latifolia. (?)

saligna Greene in Pittonia, III. 99 (1896).—**Brachyacanthae.**—Colorado (type locality: "along lower Cimarron River").

sanguinea Torrey & Gray, Fl. N. Am. I. 464 (1840), not Pallas.—**Macracanthae.** (?)

sanguinea β. Douglasii (Lindl.) Torrey & Gray, Fl. N. Am. I. 464 (1840) = C. Douglasii.

Sargentii Beadle in Bot. Gaz. XXVIII. 407 (1899).—**Intricatae.**—Georgia, Alabama, Tennessee (type locality: Valleyhead, Ala.).

sarniensis Sargent in Ontario Nat. Sci. Bull. IV. 34 (1908).—**Tenuifoliae.**—Ontario (type locality: Sarnia).

saturata Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 619 (1905).—**Tenuifoliae.**—Pennsylvania (type locality: Sellersville).

Saundersiana Sargent in Ontario Nat. Sci. Bull. IV. 66 (1908).—**Anomalae.**—Ontario, New York, Ohio (type locality: London, Ont.).

sauratonae Ashe in Bot. Gaz. XXVIII. 270 (1899).—**Punctatae.**—North Carolina (type locality: "along streams in the Sauraton Mountains"). (?)

* This name was proposed by Mr. Ashe to replace Crataegus densiflora Sargent for the reason, as he states, that the latter had been previously used in the genus (Desf. ex K. Koch, Dendr. I. 186, as a synonym). However, Desfontaines does not appear to have made such a combination, the error apparently having been made by Koch in transcribing from Spach (Hist. Vég. II. 88). Since the name *Crataegus densiflora* Desf. is thus not a valid name and has no standing, Sargent's specific name must be maintained.

CRATAEGUS

saxatilis Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 640 (1905).—**Intricatae.**—Pennsylvania (type locality: Newtown).

scabera Sargent, Trees and Shrubs, II. 245 (1913).—**Macracanthae.**—Missouri (type locality: Pleasant Grove).

scabra Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 242 (1910).—**Intricatae.**—Pennsylvania (type locality: Orbisonia).

scabrida Sargent in Rhodora, III. 29 (1901).—**Anomalae.**—Southeastern Canada, New England, New York, Pennsylvania (type locality: Middlebury, Vt.).

scabriuscula Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 605 (1905).—**Pruinosae.**—Pennsylvania (type locality: Durham).

schizophylla Eggleston in Bull. Torrey Bot. Club, XXXVIII. 243 (1911).—**Crus-galli.**—Massachusetts (type locality: Martha's Vineyard).

Schneckii Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. 8 (1900).—**Virides.**—Illinois (type locality: Lawrenceville). (?)

Schuettei Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. pt. 2, 7 (1901).—**Tenuifoliae.**—Wisconsin (type locality: Green Bay).

Schweinitziana Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 652 (1905).—**Intricatae.**—Pennsylvania (type locality: Sellersville).

scitula Sargent in N. Y. State Mus. Bull. CLXVII. 84 (1913).—**Pruinosae.**—New York (type locality: Chapinville).

scopulorum Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 227 (1910).—**Rotundifoliae.**—Pennsylvania (type locality: Campbell's Ledge, Luzerne County).

Searsii Sargent in Rhodora, VII. 183 (1905).—**Macracanthae.**—Massachusetts (type locality: Southboro).

seclusa Sargent, Trees and Shrubs, II. 239 (1913).—**Pruinosae.**—Missouri, Arkansas (type locality: Pleasant Grove).

seclusa Sargent in N. Y. State Mus. Bull. CLXVII. 89 (1913) = C. iterata Sarg.

secta Sargent in Rep. Missouri Bot. Gard. XIX. 83 (1908).—**Punctatae.**—Missouri, Kansas, Arkansas (type locality: Carthage, Mo.).

sectilis Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 23 (1903).—**Silvicolae.**—North Carolina (type locality: Marion). (?)

seducta Sargent in Rep. Missouri Bot. Gard. XXII. 79 (1912).—**Pruinosae.**—Missouri, Arkansas (type locality: Noel, Mo.).

Seelyana Sargent in Rhodora, VII. 209 (1905).—**Anomalae.**—Vermont (type locality: Middlebury).

segnis Beadle in Biltmore Bot. Studies, I. 32 (1901).—**Flavae.**—Alabama (type locality: Greenville).

sejuncta Sargent in N. Y. State Mus. Bull. CV. Bot. IX. 62 (1906).—**Coccineae.**—Ontario, New England and New York, west to Ohio and Indiana (type locality: Albany, N. Y.).

CRATAEGUS

senta Beadle in Bot. Gaz. xxx. 341 (1900).—**Flavae.**—North Carolina (type locality: Biltmore).

sequax Ashe in Jour. Elisha Mitchell Sci. Soc. xx. 50 (1904).—**Tenuifoliae.**—Pennsylvania (type locality: Berks County).

sera Sargent in Bot. Gaz. xxxiii. 115 (1902)—**Molles.**— Ontario, Michigan, Wisconsin, Illinois (type locality: Joilet, Ill.).

serena Sargent in Rhodora, vii. 201 (1905).—**Tenuifoliae.**—Massachusetts (type locality: Lenox).

sertata Sargent in Bot. Gaz. xxxv. 381 (1903).—**Coccineae.**—Wisconsin, Indiana, Illinois (type locality: "northern Illinois").

setosa Sargent in Rep. Missouri Bot. Gard. xix. 72 (1908).—**Crus-galli.**—Missouri (type locality: Grandin).

severa Sargent, Trees and Shrubs, ii. 59 (1908).—**Crus-galli.**—Missouri (type locality: Grandin).

sextilis Sargent in Bot. Gaz. xxxv. 390(1903).—**Tenuifoliae.**—Illinois (type locality: Thatcher's Park, Cook County).

Shaferi Ashe in Ann. Carnegie Mus. i. 397 (1902).—**Pruinosae.**—Pennsylvania (type locality: Carnot).

Shallotte Ashe in Bull. N. Car. Exper. Sta. clxxv. 113 (1900).—**Macracanthae.**—North Carolina (type locality: Scranton). (?)

sheridana Nelson in Bot. Gaz. xxxiv. 370 (1902).—**Macracanthae.**—Wyoming (type locality: Sheridan). (?)

shirleyensis Sargent, Trees and Shrubs, ii. 244 (1913).—**Anomalae.**—Massachusetts (type locality: Shirley).

sicca Sargent in Rep. Missouri Bot. Gard. xix. 101 (1908).—**Pruinosae.**—Missouri (type locality: Pacific).

siderea Sargent in Proc. Acad. Nat. Sci. Phila. lxii. 212 (1910).—**Tenuifoliae**—Pennsylvania (type locality: Schenley Park, Pittsburgh).

signata Beadle in Biltmore Bot. Studies, i. 42 (1901).—**Crus-galli.**—Alabama, Mississippi (type locality: Mobile, Ala.).

silvestris Sargent in Ontario Nat. Sci. Bull. iv. 15 (1908).—**Punctatae.**—Ontario (type locality: London).

silvicola Beadle in Bot. Gaz. xxviii. 414 (1899) = C. drymophila Sarg.

silvicola var. *Beckwithae* (Sarg.) Eggleston in Rhodora, x. 81 (1908) = C. Beckwithae Sarg.

simulans Sargent in N. Y. State Mus. Bull. cxxii. 125 (1908).—**Anomalae.**—New York (type locality: Hemlock Lake, Livingston County).

simulata Sargent in Rep. Missouri Bot. Gard. xxii. 82 (1912).—**Macracanthae.**—Missouri (type locality: Joplin).

singularis Sargent in N. Y. State Mus. Bull. cxxii. 106 (1908) = C. asperifolia Sarg.

CRATAEGUS

sinistra Beadle in Biltmore Bot. Studies, I. 44 (1901).—**Crus-galli.**—Tennessee (type locality: West Nashville).

sitiens Ashe in Jour. Elisha Mitchell Sci. Soc. XX. 54 (1904).—**Pruinosae**—Michigan, Ohio (type locality: St. Clair County, Mich.).

Slavini Sargent in N. Y. State Mus. Bull. CXXII. 57 (1908).—**Tenuifoliae.**—New York (type locality: Buffalo).

Smithii Sargent, Trees and Shrubs, I. 67 (1903).—**Uniflorae.**—Pennsylvania (type locality: Lowne's Run, Springfield).

sodalis Beadle in Biltmore Bot. Studies, I. 80 (1902).—**Flavae.**—Alabama (type locality: Girard).

sonnenbergensis Sargent in N. Y. State Mus. Bull. CLXVII. 120 (1922).—**Macracanthae.**—New York (type locality: "Sonnenberg," Canandaigua, Ontario County).

sordida Sargent in Bot. Gaz. XXXIII. 114 (1902).—**Punctatae.**—Missouri (type locality: Pleasant Grove).

sordida var. villosa Sargent in Jour. Arnold Arb. VI. 2 (1925).—Missouri, Arkansas (type locality: Fulton, Ark.).

sororia Beadle in Bot. Gaz. XXX. 336 (1900).—**Flavae.**—Florida, Georgia Alabama (type locality: Rome, Ga.).

spathulata Michaux, Fl. Bor. Am. I. 288 (1803).—**Microcarpae.**—North Carolina to Florida, west to eastern Texas, Arkansas, Oklahoma and southwestern Missouri (type locality not given).

spathulata var. *flavanthera* Sargent apud Palmer in Ann. Missouri Bot. Gard. III. 380 (1916), as "flavantha" = C. spathulata Michx.

spatifolia Sargent in N. Y. State Mus. Bull. CXXII. 98 (1908).—**Tenuifoliae.**—New York (type locality: Coopers Plains).

spatiosa Sargent in Rhodora, VII. 180 (1905).—**Macracanthae.**—Connecticut (type locality: Mumford's Point, Groton).

speciosa Sargent, Trees and Shrubs, I. 65 (1903) = C. coccinoides Ashe.

spinea Sargent in N. Y. State Mus. Bull. CLXVII. 122 (1913).—**Macracanthae.**—New York (type locality: Coopers Plains).

spinifera Sargent in N. Y. State Mus. Bull. CXXII. 111 (1908).—**Macracanthae.**—New York (type locality: Coopers Plains).

spinosissima Loddiges, Cat. 40 (1826), nomen nudum.—Loudon, Arb. Brit. II. 849 (1838). As synonym of *C. flava lobata* Lindl.

spinulosa Sargent in Rep. Missouri Bot. Gard. XIX. 120 (1908).—**Macracanthae.**—Missouri (type locality: Webb City).

spissa Sargent in N. Y. State Mus. Bull. CXXII. 122 (1908).—**Rotundifoliae.**—New York (type locality: North Elba).

spissiflora Sargent in Proc. Rochester Acad. Sci. IV. 112 (1903) = C. Robesoniana Sarg.

splendens Loddiges, Cat. 40 (1826), nomen nudum.—Loudon, Arb. Brit. II. 820 (1838), as synonym of C. crus-galli var. splendens Ait.

CRATAEGUS

splendida Sargent in Ontario Nat. Sci. Bull. IV. 45 (1908).—**Coccineae.**—Ontario (type locality: Sarnia).

stellata Sargent, Trees and Shrubs, II. 244 (1913).—**Intricatae.**—Connecticut (type locality: East Lyme).

stenophylla Sargent in Ontario Nat. Sci. Bull. IV. 76 (1908).—**Macracanthae.**—Ontario (type locality: Toronto).

stenosepala Sargent in Jour. Arnold Arb. III. 186 (1922).—**Virides.**—Texas (type locality: Duke, Ft. Bend County).

steubenensis Sargent in N. Y. State Mus. Bull. CXXII. 103 (1908).—**Coccineae.**—New York (type locality: Coopers Plains).

Stevensiana Sargent in Jour. Arnold Arb. IV. 99 (1923).—**Crus-galli.**—Kansas, Oklahoma (type locality: Neodesha, Kas.).

stipulacea Loddiges, Cat. 40 (1826), nomen nudum.—Loudon, Arb. Brit. II. 843 (1838), as a synonym of C. mexicana Moç. & Sessé.

stipulacea var. *microphylla* Hort. ex Nicholson in Hand-list Arb. Kew, pt. 1, 197 (1894) as synonym of C. crus-galli var. linearis DC.

stolonifera Sargent in Bot. Gaz. XXXV. 109 (1903).—**Silvicolae.**—New York, Pennsylvania, Delaware (type locality: Wilmington, Del.).

Stonei Sargent in Rhodora, V. 62 (1903).—**Intricatae.**—Massachusetts (type locality: Pelham).

straminea Beadle in Bot. Gaz. XXX. 345 (1900).—**Intricatae.**—Alabama, Tennessee, Oklahoma (type locality: Valleyhead, Ala.).

straminea var. *Bissellii* (Sarg.) Eggleston in N. Y. State Mus. Bull. CCXLIII–IV. 63 (1923) = C. Bissellii.

stratfordensis Sargent in Rhodora, VII. 178 (1905).—**Macracanthae.**—Connecticut (type locality: Stratford).

Streeterae Sargent in Proc. Rochester Acad. Sci. IV. 119 (1903).—**Tenuifoliae.**—Southeastern Canada, New York, Michigan (type locality: Rochester, N. Y.).

strigosa Sargent in N. Y. State Mus. Bull. CXXII. 51 (1908).—**Silvicolae.**—New York: (type locality: Buffalo).

strongylophylla Sargent in Rep. Missouri Bot. Gard. XIX. 44 (1908) = C. crus-galli L.

structilis Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 12 (1903).—**Macracanthae.**—Ontario, New York and Pennsylvania, west to Michigan, Illinois and Missouri (type locality: Berks County, Pa.).

suavis Sargent in N. Y. State Mus. Bull. CXXII. 59 (1908).—**Tenuifoliae.**—Ontario, New York, Michigan, Ohio (type locality: Buffalo, N. Y.).

sublobulata Sargent in Jour. Arnold Arb. III. 4 (1922).—**Crus-galli.**—Texas (type locality: San Augustine).

submollis Sargent in Bot. Gaz. XXXI. 7 (1901).—**Molles.**—Southeastern Canada, New England (type locality: Jamaica Plain, Mass.).

CRATAEGUS

suborbiculata Sargent in Rhodora, III. 72 (1901).—**Punctatae.**—Quebec (type locality: Caughnawaga).

subpilosa Sargent in Jour. Arnold Arb. III. 6 (1922).—**Crus-galli.**—Arkansas (type locality: Eureka Springs).

subrotundifolia Sargent in Bot. Gaz. XXXV. 394 (1903).—**Rotundifoliae.**—Wisconsin, Illinois (type locality: Lake Zurich, Ill.).

subserrata Bentham, Pl. Hartweg. 10 (1839) = C. mexicana Moç. & Sessé.

subvillosa Schrader ex Torrey & Gray, Fl. N. Am. I. 465 (1840), as a synonym of *C. coccinea* var. *mollis.*

subviridis Beadle in Biltmore Bot. Studies, I. 51 (1902).—**Virides.**—Florida (type locality: Chattahoochee).

succincta Sargent in Rep. Missouri Bot. Gard. XIX. 78 (1908).—**Punctatae.**—Missouri (type locality: Pacific).

succulenta Schrader, Ind. Sem. Götting. (1823), ex Lange, Rev. Gen. Crat. 82 (1897).—**Macracanthae.**—Southeastern Canada, New England, New York, Pennsylvania.

succulenta var. *macracantha* (Lodd.) Eggleston in N. Y. State Mus. Bull. CCXLIII–IV. 65 (1923), as "macrantha," = C. macracantha.

succulenta var. *rhombifolia* (Sarg.) Eggleston in N. Y. State Mus. Bull. CCXLIII–IV. 65 (1923) = C. rhombifolia.

sucida Sargent in Rep. Missouri Bot. Gard. XIX. 80 (1908).—**Punctatae.**—Illinois, Missouri, Arkansas (type locality: Monteer, Mo.).

superata Sargent, Trees and Shrubs, II. 241 (1922).—**Pruinosae.**—Michigan (type locality: Grand Rapids).

sutherlandensis Sargent in Jour. Arnold Arb. III. 192 (1922).—**Virides.**—Texas (type locality: Sutherland Springs).

sutherlandensis var. spinescens Sargent in Jour. Arnold Arb. III. 193 (1922).—Texas (type locality: Sutherland Springs).

swanensis Sargent in Jour. Arnold Arb. III. 182 (1922).—**Punctatae.**—Missouri (type locality: Arnold Arboretum, cultivated from seed collected at Swan, Mo.).

taetrica Sargent in Rep. Geol. Surv. Mich. 1906, 541 (1907).—**Tenuifoliae.**—Michigan, Illinois (type locality: Port Huron, Mich.).

tantula Sargent in Rep. Missouri Bot. Gard. XIX. 49 (1908).—**Crus-galli.**—Missouri (type locality: Webb City).

tanuphylla Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 247 (1910).—**Macracanthae.**—Pennsylvania, Ohio (type locality: Pittsburgh, Pa.).

tarda Sargent in Bot. Gaz. XXXV. 392 (1903).—**Tenuifoliae.**—Wisconsin, Illinois (type locality: Barrington, Ill.).

tardiflora Sargent in Rep. Missouri Bot. Gard. XIX. 47 (1908).—**Crus-galli.**—Missouri, Arkansas (type locality: Christian County, Mo.).

tardifolia Ashe in Bull. Charleston Mus. XII. 41 (1916).—**Intricatae.**—South Carolina (type locality not given). (?)

CRATAEGUS

tardipes Sargent in Ontario Nat. Sci. Bull. IV. 51 (1908) = C. Holmesiana var. tardipes Sarg.

Tatnalliana Sargent in Bot. Gaz. XXXV. 106(1903).—**Molles.**—Pennsylvania, Delaware (type locality: Wilmington, Del.).

tecta Beadle in Biltmore Bot. Studies, I. 26 (1901).—**Intricatae.**—Alabama (type locality: Marshall County).

tenax Ashe in Jour. Elisha Mitchell Sci. Soc. XVIII. 21 (1902).—**Punctatae.**—Ontario, Michigan (type locality: Port Huron, Mich.).

tenella Ashe in Ann. Carnegie Mus. I. 388 (1902).—**Tenuifoliae.**—Connecticut, New York, Pennsylvania, Delaware (type locality: Delaware County, Pa.).

tenera Ashe in Jour. Elisha Mitchell Sci. Soc. XX. 52 (1904).—**Tenuifoliae.**—Ohio (type locality: Sandusky).

tennowana Nelson in Bot. Gaz. LIV. 408 (1912).—**Douglasianae.**—Idaho (type locality: Falk's Store, Canyon County). (?)

tenuifolia Britton in Bull. N. Y. Bot. Gard. I. 448 (1900).—**Tenuifoliae.**—Virginia (type locality: "south fork of Holston River").

tenuiloba Sargent in Proc. Rochester Acad. Sci. IV. 122 (1903).—**Tenuifoliae.**—New York (type locality: Rochester).

tenuirama Ashe in Bull. Charleston Mus. XII. 41 (1916).—Group?—South Carolina (type locality: "piedmont of South Carolina"). (?)

tenuis Sargent in Rep. Missouri Bot. Gard. XIX. 48 (1908).—**Crus-galli.**—Missouri (type locality: Pacific).

tenuisepala Sargent in Rep. Missouri Bot. Gard. XIX. 68 (1908).—**Crus-galli.**—Missouri, Arkansas (type locality: Moark, Ark.).

tenuispina Sargent in Rep. Missouri Bot. Gard. XIX. 58 (1908).—**Crus-galli.**—Missouri (type locality: Grandin).

tenuissima Sargent, Trees and Shrubs, II. 243 (1913).—**Intricatae.**—Pennsylvania (type locality: Scranton).

teres Beadle in Biltmore Bot. Studies, I. 43 (1901).—**Flavae.**—Alabama (type locality: Montgomery).

tersa Beadle in Biltmore Bot. Studies, I. 129 (1902).—**Crus-galli.**—Louisiana (type locality: Opelousas).

tetrica Beadle in Biltmore Bot. Studies, I. 46 (1901).—**Crus-galli.**—Tennessee (type locality: Nashville).

texana Buckley in Proc. Acad. Nat. Sci. Phila. 1861, 454 (1861).—**Molles.**—Texas (type region: "along Brazos and Colorado Rivers").

Thayeri Sargent in Rhodora, V. 113 (1903).—**Coccineae.**—Massachusetts (type locality: West Boylston).

tiliaefolia K. Koch in Verh. Ver. Beförd. Gartenb. Preuss. n. ser. I. 247 (Weissd. 27) (1853) = C. mollis Scheele.

tinctoria Ashe in Jour. Elisha Mitchell Sci. Soc. XVIII. 27 (1902).—Group?—North Carolina, Tennessee (type locality not given). (?)

CRATAEGUS

tomentosa Linnaeus, Spec. I. 476 (1753).—**Macracanthae.**—Ontario and New York, south to North Carolina and Georgia, west to Wisconsin, Iowa, Missouri, Arkansas and eastern Kansas (type region: "Virginia").

tomentosa var. *Chapmani* Beadle in Bot. Gaz. XXV. 360 (1898) = C. Chapmanii Ashe.

tomentosa δ. *flabellata* (Bosc) Wood, Cl. Book, 330 (1861) = C. flabellata.

tomentosa var. microcarpa Chapman, Fl. ed. 3, 139 (1897). (Type locality: Rome, Georgia.) (?)

tomentosa var. *mollis* (Torr. & Gray) Gray, Man. ed. 5, 160 (1867) = C. mollis.

tomentosa β. *plicata* Wood, Cl. Book, 330 (1861) = C. punctata Jacq.?

tomentosa var. *punctata* (Jacq.) Gray, Man. ed. 2, 124 (1856) = C. punctata.

tomentosa var. pyrifolia (Ait.) Gray, Man. ed. 5, 150 (1867). (?)

tomentosa var. *Smithii* (Sarg.) Eggleston in Rhodora, X. 79 (1908) = C. Smithii.

torta Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 176 (1910).—**Pruinosae.**—Pennsylvania (type locality: Nine Mile Run, near Pittsburgh).

tortilis Ashe in Jour. Elisha Mitchell Sci. Soc. XVIII. 19 (1902).—Group?—Wisconsin (type locality: Milwaukee). (?)

tortuosa Sargent in N. Y. State Mus. Bull. CXXII. 47 (1908).—**Silvicolae.**—New York (type locality: Buffalo).

torva Beadle in Biltmore Bot. Studies, I. 130 (1902).—**Crus-galli.**—Georgia, Alabama, Louisiana (type locality: Birmingham, Ala.).

trachyphylla Sargent in Bot. Gaz. XXXV. 388 (1903).—**Tenuifoliae.**—Illinois (type locality: Mokena).

Tracyi Ashe apud Eggleston in Bull. Torrey Bot. Club, XXXVI. 639 (1909).—**Molles.**—Texas (type locality: "foothills of Davis Mountains").

trahax Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 27 (1903).—**Crus-galli.**—Pennsylvania, Indiana (type locality: Berks County, Pa.).

transmississippiensis Sargent in Jour. Arnold Arb. III. 7 (1922).—**Molles.**—Missouri, Arkansas (type locality: Marion County, Ark., near Cotter).

Treleasei Sargent, Trees and Shrubs, I. 63 (1903).—**Molles.**—Missouri (type locality: St. Francois County).

trianthophora Sargent, Trees and Shrubs, II. 11 (1907).—**Uniflorae.**—Missouri, Arkansas, Texas (type locality: Grandin, Mo.).

tribulosa Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 182 (1910).—**Pruinosae.**—Pennsylvania (type locality: Bedford).

triflora Chapman, Fl. ed. 2, Suppl. 2, 684 (1892).—**Triflorae.**—Georgia, Alabama, Mississippi (type locality: cliffs of the Coos River, Ga.).

CRATAEGUS

trifoliata Bosc ex DeCandolle, Prodr. II. 630 (1825), nomen nudum.

trilobata Loddiges, Cat. 46 (1836), nomen nudum.—Loudon, Arb. Brit. II. 824 (1838), "A hybrid raised from seed in the Hammersmith Nursery about 1820." (?)

Triosteum Gruber in Bull. Torr. Bot. Club, XXXII. 392 (1905).—**Punctatae.**—Pennsylvania (type locality: Moselem). (?)

tripartita Sargent in Jour. Arnold Arb. III. 188 (1922).—**Virides.**—Texas (type locality: Columbia).

trisperma Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. pt. 2, 17 (1901).—Group?—North Carolina (type locality: between north and south forks of Toe River, Yancey County). (?)

tristis Beadle in Biltmore Bot. Studies, I. 84 (1902).—**Flavae.**—Georgia (type locality: Rome).

triumphalis Sargent, Trees and Shrubs, II. 236 (1913).—**Crus-galli.**—Arkansas (type locality: Fulton).

truculenta Sargent in N. Y. State Mus. Bull. CLXVII. 118 (1913).—**Macracanthae.**—New York (type locality: Belfast).

truncata Sargent in Rep. Missouri Bot. Gard. XIX. 57 (1908).—**Crus-galli.**—Missouri (type locality: Swan).

tumida Sargent, Trees and Shrubs, II. 240 (1913).—**Pruinosae.**—Missouri (type locality: Dexter).

turbinata Pursh, Fl. Am. Sept. II. 735 (1814) = C. spathulata Michx.

Twiningii Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 230 (1910).—**Intricatae.**—Pennsylvania (type locality: Scranton).

uber Ashe in Jour. Elisha Mitchell Sci. Soc. XX. 47 (1904).—**Tenuifoliae.**—Michigan (type locality: Summerville).

umbratilis Sargent in Rhodora, VII. 192 (1905).—**Punctatae.**—Connecticut (type locality: Litchfield).

umbrosa Sargent in Rep. Missouri Bot. Gard. XIX. 106 (1908).—**Molles.**—Illinois, Missouri (type locality: Carondelet, Mo.).

uncta Sargent in N. Y. State Mus. Bull. CXXII. 91 (1908).—**Pruinosae.**—New York (type locality: Coopers Plains).

uniflora Muenchhausen, Hausv. v. 147 (1770).—**Uniflorae.**—New York to Florida, west to Kentucky and Mississippi (type locality not given).

uniflora var. florida (Lodd.) Zabel in Beissner, Schelle & Zabel, Handb. Laubholz-Ben. 170 (1903), nomen nudum. (?)

uniflora var. grossulariifolia (Lodd.) Zabel in Beissner, Schelle & Zabel, Handb. Laubholz-Ben. 170 (1903), nomen nudum. (?)

unilateralis Persoon, Syn. II. 37 (1807).—**Uniflorae.**—(?)

uniqua Sargent, Trees and Shrubs, II. 237 (1913).—**Crus-galli.**—Louisiana, Texas (type locality: Marshall, Tex.).

uplandia Sargent in Proc. Acad. Nat. Sci. Phila. LVII. 594 (1905).—**Pruinosae.**—Pennsylvania (type locality: Upper Darby).

CRATAEGUS

urasina Hort. ex Nicholson in Hand-list Arb. Kew, pt. 1, 203 (1894), as a synonym of C. mollis Scheele.

urbana Sargent in Rep. Geol. Surv. Mich. 1906, 556 (1907).—**Anomalae.**—Michigan (type locality: Grand Rapids).

urbica Sargent in N. Y. State Mus. Bull. CLXVII. 105 (1913).—**Molles.**—New York (type locality of *C. oblongifolia* Sarg., which this name replaces: Menands).

uticaensis Sargent in N. Y. State Mus. Bull. CLXVII. 99 (1913).—**Coccineae.**—New York (type locality: Utica).

uvaldensis Sargent in Jour. Arnold Arb. III. 195 (1922).—**Virides.**—Texas (type locality: Uvalde).

vaga Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 249 (1910).—**Macracanthae.**—Pennsylvania (type locality: Bedford Springs).

Vailiae Britton in Bull. Torrey Bot. Club, XXIV. 53 (1897).—**Macracanthae.**—Virginia, North Carolina (type locality: Roanoke, Va.).

valens Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 15 (1903).—**Molles.**—Illinois (type locality: "southern Illinois"). (?)

valida Beadle in Biltmore Bot. Studies, I. 77 (1902).—**Flavae.**—Georgia (type locality: Rockmart).

vallicola Sargent in Rep. Missouri Bot. Gard. XIX. 74 (1908).—**Crus-galli.**—Ohio, Missouri (type locality: Barretts Station, St. Louis County, Mo.).

varians Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 225 (1910).—**Rotundifoliae.**—Pennsylvania (type locality: Bedford Springs).

vegeta Sargent in Bot. Gaz. XXXV. 396 (1903).—**Macracanthae.**—Illinois (type locality: Calumet).

vegrandis Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 202 (1910).—**Silvicolae.**—Pennsylvania (type locality: Scranton).

velata Ashe in Jour. Elisha Mitchell Sci. Soc. XVIII. 26 (1902).—**Tenuifoliae.**—North Carolina (type locality of *C. atropurpurea* Ashe, which this name replaces: Yancey County). (?)

velutina Sargent, Trees and Shrubs, II. 238 (1913).—**Virides.**—Louisiana, Arkansas, Texas (type locality: Fulton, Ark.).

venosa Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 16 (1903).—**Molles.**—Illinois (type locality: "southern Illinois"). (?)

venulosa Sargent in Ontario Nat. Sci. Bull. IV. 96 (1908).—**Macracanthae.**—Ontario (type locality: London).

venusta Beadle in Bot. Gaz. XXX. 338 (1900).—**Intricatae.**—Alabama (type locality: Birmingham).

venustula Sargent in N. Y. State Mus. Bull. CXXII. 79 (1908).—**Macracanthae.**—Ontario, New York (type locality: Niagara Falls, N. Y.).

verecunda Sargent in Proc. Rochester Acad. Sci. IV. 109 (1903).—**Intricatae.**—Massachusetts, New York (type locality: Rochester, N. Y.).

CRATAEGUS

verecunda var. *gonocarpa* Peck in N. Y. State Mus. Bull. CXXXIX. 33 (1910) = C. Dodgei Ashe.

verna Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 16 (1903).—**Molles.**—Illinois, Missouri (type locality not given). (?)

vernans Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 10 (1903).—**Macracanthae.**—Virginia, West Virginia (type locality not given). (?)

verrucalis Peck in N. Y. State Mus. Bull. CXXII. 123, 158 (1908).—**Rotundifoliae.**—New York (type locality: Herkimer County).

verruculosa Sargent, Man. Trees N. Am. 394 (1905).—**Punctatae.**—Missouri, Arkansas (type locality: Springfield, Mo.).

versuta Beadle in Biltmore Bot. Studies, I. 112 (1902).—**Flavae.**—Georgia (type locality: Albany).

vesca Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 13 (1903).—**Molles.**—Iowa (type locality: Keokuk). (?)

viaria Beadle in Biltmore Bot. Studies, I. 101 (1902).—**Flavae.**—Florida (type locality: Jacksonville).

viatica Ashe in Ann. Carnegie Mus. I. 398 (1902).—**Pruinosae.**—Pennsylvania (type locality: Pittsburgh).

viburnifolia Sargent, Trees and Shrubs, II. 145 (1911).—**Molles.**—Texas (type locality: Columbia).

vicana Beadle in Biltmore Bot. Studies, I. 104 (1902).—**Flavae.**—Florida (type locality: Tavares).

vicina Sargent in Rep. Missouri Bot. Gard. XIX. 77 (1908).—**Punctatae.**—Missouri, Kansas (type locality: Webb City, Mo.).

vicinalis Beadle in Biltmore Bot. Studies, I. 124 (1902).—**Pruinosae.**—Georgia, Tennessee (type locality: Chattanooga, Tenn.).

Victorinii Sargent in Jour. Arnold Arb. III. 203 (1922).—**Macracanthae.**—Quebec (type locality: grounds of College Longueuil, opposite Montreal).

villaris Beadle in Biltmore Bot. Studies, I. 108 (1902).—**Flavae.**—Florida (type locality: Citra).

villicarpa Sargent in Rep. Missouri Bot. Gard. XIX. 112 (1908).—**Intricatae.**—Missouri, Arkansas (type locality: Swan, Mo.).

villiflora Sargent, Trees, and Shrubs, II. 61 (1908).—**Crus-galli.**—Missouri, Arkansas, Mississippi (type locality: Grandin, Mo.).

viminea Ashe in Jour. Elisha Mitchell Sci. Soc. XVIII. 23 (1902).—Group?—North Carolina (type locality: on Buffalo Creek, Ashe County). (?)

virella Ashe in Ann. Carnegie Mus. I. 396 (1923).—**Pruinosae.**—Pennsylvania (type locality: Berks County).

virgata Ashe in Jour. Elisha Mitchell Sci. Soc. XIX. 24 (1903).—**Intricatae.**—North Carolina (type locality: Elk Cross Roads). (?)

virginiana Hort. ex Loudon, Arb. Brit. II. 842 (1838) as synonym of C. virginica Lodd.

CRATAEGUS

virginica Loddiges, Cat. 40 (1826), nomen nudum.—Loudon, Arb. Brit. II. 842 (1838).—**Flavae.**—"A native of Virginia." (?)

viridimontana Sargent in Rhodora, VII. 204 (1905).—**Tenuifoliae.**—Vermont (type locality: East Middlebury).

viridis Linnaeus, Spec. I. 476 (1753).—**Virides.**—Virginia to Florida, west to Illinois, Missouri and eastern Kansas, Oklahoma and Texas (type region: "Virginia").

viridis var. *nitida* Engelmann in Britton & Brown, Ill. Fl. II. 242 (1897) = C. nitida.

virilis Sargent in Ontario Nat. Sci. Bull. IV. 68 (1908).—**Anomalae.**—Ontario (type locality: Toronto).

visenda Beadle in Biltmore Bot. Studies, I. 79 (1902).—**Flavae.**—Florida (type locality: Bristol).

vitellina Ashe in Jour. Elisha Mitchell Sci. Soc. XVIII. 27 (1902).—Group?—North Carolina (type locality: Madison County). (?)

vittata Ashe in Jour. Elisha Mitchell Sci. Soc. XX. 50 (1904).—**Tenuifoliae.**—Pennsylvania (type locality: Berks County). (?)

vivida Sargent in Ontario Nat. Sci. Bull. IV. 47 (1908).—**Coccineae.**—Ontario, New York (type locality: Toronto, Ont.).

vulsa Beadle in Biltmore Bot. Studies, I. 39 (1901).—**Virides.**—Georgia, Alabama (type locality: Gadsden, Ala.).

Warneri Sargent in Jour. Arnold Arb. III. 184 (1922).—**Crus-galli?**—Texas (type locality: Palestine).

Watsoniana (Spach) Roemer, Fam. Nat. Syn. III. 117 (1847).)—**Crus-galli.**—(?)

Websteri Sargent in Rhodora, VII. 215 (1905).—**Rotundifoliae.**—New Hampshire (type locality: Holderness).

Wheeleri Nelson in Bot. Gaz. XXXIV. 369 (1902).—**Douglasianae.**—Colorado (type locality: Sapinero). (?)

Wheeleri Sargent in Rep. Geol. Surv. Mich. 1906, 552 (1907) = C. diversifolia Sarg.

Wilkinsoni Ashe in Bot. Gaz. XXXV. 435 (1903).—**Crus-galli.**—Ohio, Kentucky (type locality: Mansfield, O.).

Williamsii Eggleston in Bull. Torrey Bot. Club, XXXVI. 641 (1909).—**Rotundifoliae.**—Montana (type locality: Columbia Falls).

wilmorensis Sargent in Proc. Acad. Nat. Sci. Phila. LXII. 168 (1910).—**Pruinosae.**—Pennsylvania (type locality: between Portage and Wilmore, Cambria County).

Wootoniana Eggleston in Torreya, VII. 236 (1908).—**Tenuifoliae.**—New Mexico (type localities: Socorro and Lincoln Counties). (?)

xanthocarpos Medicus, Gesch. Bot. 85 (1793) = C. punctata var. aurea Ait.

xanthophylla Sargent in N. Y. State Mus. Bull. CXXII. 48 (1908).—**Silvicolae.**—New York (type locality: Buffalo).

CRATAEGUS

yadkinensis Ashe in Jour. Elisha Mitchell Sci. Soc. XVII. 17 (1900).—**Flavae.**—North Carolina (type locality: along Yadkin River, Roan County). (?)

Youngii Sargent in Jour. Arnold Arb. IV. 105 (1923).—**Microcarpae.**—North Carolina, South Carolina (type locality: Greensboro, N. Car.).

NAMES EXCLUDED FROM THE GENUS

CRATAEGUS

Amelanchier Desfontaines, Hist. Arb. II. 149 (1809) = Amelanchier canadensis Medic.

amoena Salisbury, Prodr. 357 (1796) = Amelanchier canadensis Medic.

arbutifolia Aiton, Hort. Kew. ed. 2, III. 202 (1811) = Heteromeles arbutifolia Roem.

coronaria (L.) Salisbury, Prodr. 357 (1796) = Malus coronaria Mill.

densiflora Desfontaines apud K. Koch, Dendr. I. 186 (1869), as a synonym = Heteromeles arbutifolia Roem.

racemosa Lamarck, Encycl. I. 84 (1783) = Amelanchier canadensis Medic.

spicata Lamarck, Encyl. I. 84 (1873) = Amelanchier spicata K. Koch (in part).

SYNOPSIS OF THE GROUPS

Nutlets not pitted or deeply concave on ventral surfaces.
- Leaves merely serrate or dentate or rarely slightly lobed on shoots.
  - Veins of leaves not deeply impressed; fruit hard and inedible, dotted or blotched but rarely punctate.....I. **Crus-galli.**
  - Veins of leaves deeply impressed; fruit becoming soft and edible. II. **Punctatae.**
- Leaves of flowering branches or some of them variously lobed or divided.
  - Fruit usually more than 10 mm. diameter (8–20 or rarely more or less); nutlets variously ridged or rounded on back.
    - Leaves of flowering branches usually conspicuously narrowed at base or attenuate into winged petioles.
      - Corymbs few-flowered (1–5 flowers or rarely a few more).
        - Calyx lobes small, not conspicuously serrate; fruit usually becoming soft and edible.....XVIII. **Aestivales.**
        - Calyx lobes large and foliaceous, conspicuously serrate; fruit usually hard and inedible (except in C. austromontana).
          - Corymbs 1–3-flowered; leaves relatively small, mostly spatulate or obovate.....XVII. **Uniflorae.**
          - Corymbs 3–5-flowered (or rarely a few more); leaves larger; corymbs villous or glandular but not conspicuously bracteate. XVI. **Triflorae.**
          - Corymbs 5–10-flowered (or rarely a few more); inflorescence conspicuously glandular and bracteate.....XV. **Bracteatae.**
      - Corymbs many-flowered (5–20 flowers or more).
        - Inflorescence and petioles generally conspicuously glandular; leaves subcoriaceous.
          - Leaves relatively large, usually of ovate or oval type; branchlets not conspicuously zig-zag.....V. **Intricatae.**
          - Leaves relatively small, usually of obovate or elliptic type; branchlets often conspicuously zig-zag.....XIV. **Flavae.**

Inflorescence and petioles generally not conspicuously glandular; leaves thin or thick.

Fruit blue or black (stramineous in var. of C. brachyacantha); leaves relatively small, thick and glossy above, those of flowering branches crenate or finely serrate, variously cut or lobed on shoots. XIX. **Brachyacanthae.**

Fruit yellow, orange or red; leaves not as above.

Fruit usually 10–16 mm. diameter; leaves firm or subcoriaceous, mainly of ovoid or elliptic type.....XII. **Rotundifoliae.**

Fruit usually 4–10 mm. diameter; leaves thin, mostly of oblong or oval type.

Leaves very variable, irregularly lobed or merely serrate; corymbs many (10–20)-flowered; fruit usually 5–10 mm. diameter.....III. **Virides.**

Leaves less variable, with shallow rounded lobes; corymbs 4–10-flowered; fruit usually 8–15 mm. diameter. IV. **Pulcherrimae.**

Leaves of flowering branches usually not conspicuously narrowed, or at least not attenuate at base, mostly of broadly ovate type, petioles slender.

Fruit becoming soft and succulent, bright red or scarlet, usually less than 15 mm. diameter. Corymbs usually glabrous; leaves thin, glabrous beneath, often finely villous-scabrate above.....VI. **Tenuifoliae.**

Fruit usually hard and inedible, 10–20 mm. diameter.

Fruiting calyx with distinct neck; leaves usually glabrous above; fruit often angular and pruinose.....VIII. **Pruinosae.**

Fruiting calyx sessile; young leaves usually villous-scabrate above; fruit seldom angular or pruinose.....VII. **Silvicolae.**

Fruit firm but becoming edible, larger (15–25 mm. diameter); leaves firm, mostly of ovate or deltoid-cordate type.

Mature leaves usually glabrous; fruit usually oblong or obovoid; fruiting calyx small.....IX. **Coccineae.**

Mature leaves usually pubescent, firm, with thick petioles and veins; stamens 10–20; nutlets 3–5.....X. **Molles.**

Mature leaves usually glabrous; fruit subglobose, calyx much enlarged; stamens 20; nutlets 5.....XI. **Dilatatae.**

Fruit 4–6 mm. diameter, bright scarlet, becoming soft and succulent; flowers small, many in a corymb; nutlets very small, not rounded or ridged on back. XIII. **Microcarpae.**

Nutlets pitted or deeply concave on ventral surfaces.

Fruit dark crimson or chestnut, becoming black when fully ripe; nutlets 5. XX. **Douglasianae.**

Fruit orange or scarlet.

Nutlets 2–3, deeply pitted or concave; flowers in usually many-flowered clusters at ends of leafy branchlets; fruit usually less than 10 mm. diameter. XXII. **Macracanthae.**

Nutlets 3–5, with shallow pits; flower usually fewer in cluster, on short terminal or lateral branchlets; fruit usually more than 10 mm. diameter. XXI. **Anomalae.**

SYNOPTICAL TABLES OF SPECIES ARRANGED BY GROUPS AND FLORAL AND FOLIAGE CHARACTERS

I. Crus-galli

A. Anthers red, rose, pink or purple (AA and AAA see p. 82)

B. Stamens about 10 (5–15) (BB see p. 81)

C. Corymbs glabrous (CC see p. 80)

D. Leaves mostly spatulate, obovate or lance-elliptic (on vigorous shoots broader but distinctly longer than broad)

accincta Sarg. Fruit narrow-oval, scarlet, 7–8 mm. diameter.

armata Beadle (?) Fruit globose, dull red, 5–8 mm. diameter. Color of anthers unknown.

attenuata Ashe. Fruit oblong, dull red or green mottled, 8–12 mm. diameter. Stamens sometimes 15 or more.

bellica Sarg. Fruit short-oblong or subglobose, dull dark red, 8–10 mm. diameter. Corymbs sometimes slightly villous.

calophylla Sarg. Fruit short-oblong or slightly oval, orange-red, dark dotted, 8–9 mm. diameter.

crus-galli L. Fruit short-oblong or subglobose, dull red, 8–12 mm. diameter.

Farwellii Sarg. Fruit oval or obovoid, crimson, 9–10 mm. diameter. Corymbs often villous.

geneseensis Sarg. Fruit short-oblong, scarlet, dark dotted, 10–12 mm. diameter.

hamata Sarg. Fruit short-oblong or ovoid, light orange-red or green, dark dotted, 11–12 mm. diameter.

helvina Ashe. (?) Fruit obovoid or subglobose, light red, 10–14 mm. diameter. Color of anthers not given.

immitis Ashe. (?) Fruit globose, dark red, green mottled, 9–12 mm. diameter. Color of anthers not given.

infesta Sarg. Fruit oblong or oval, dull yellow or tinged with orange, 9–10 mm. diameter.

macra Beadle. Fruit subglobose or oval, red, 5–8 mm. diameter.

multispina Ashe. (?) Fruit oblong, dull red-brown, 7–9 mm. diameter. Color of anthers not given.

operta Ashe. Fruit oblong, dark red, 10–12 mm. diameter. Corymbs sometimes slightly villous.

permera Sarg. Fruit short-oblong, green, red tinged, dotted, 8–9 mm. diameter.

pyracanthoides Beadle. Fruit globose, bright red, 5–8 mm. diameter.

schizophylla Egglest. Fruit pyriform-ellipsoid, dark red, 7–8 mm. diameter.

setosa Sarg. Fruit subglobose or depressed-globose, crimson, dotted, 9–11 mm. diameter. Corymbs sometimes slightly villous.

tenuis Sarg. Fruit oval to ovoid, dull green or red tinged, pale dotted, 6–7 mm. diameter.

trahax Ashe. Fruit globose or oblong, crimson, dark dotted or mottled, 8–10 mm. diameter.

Wilkinsonii Ashe. Fruit oblong, dark red, 10–14 mm. diameter.

DD. Leaves broader, obovate, oval or oblong (on vigorous shoots broadly oval to suborbicular)

Canbyi Sarg. Fruit oblong to obovoid, dark crimson, punctate, 8–10 mm. diameter.

cerasina Sarg. Fruit short-oblong, bright cherry-red, 8–10 mm. diameter. Stamens sometimes 15–20.

discolor Sarg. Fruit short-oblong to subglobose, dull red, blotched with green, 8–10 mm. diameter.

fecunda Sarg. Fruit short-oblong to subglobose, orange-red, dark dotted, 10–18 mm. diameter. Corymbs and leaves sometimes slightly villous.

lawrencensis Sarg. Fruit subglobose, green tinged with red, about 5 mm. diameter. Stamens sometimes 15 or more.

peoriensis Sarg. Fruit oblong to obovoid, bright scarlet, 7–10 mm. diameter.

persimilis Sarg. Fruit oblong to subglobose, dark crimson, dotted, about 11 mm. diameter. Corymbs sometimes slightly villous.

Reverchonii Sarg. Fruit subglobose, light scarlet, 10 mm. diameter.

robusta Sarg. Fruit short-oblong to obovoid, crimson, pale dotted, 7–8 mm. diameter. Stamens sometimes 20.

rubrifolia Sarg. Fruit subglobose, bright orange-red, 8–9 mm. diameter.

tantula Sarg. Fruit subglobose or short-oblong, dark red, dark dotted, 7–8 mm. diameter.

tenuisepala Sarg. Fruit short-oblong, orange-red, dark dotted, 8–9 mm. diameter. Stamens sometimes 15 or more.

CC. Corymbs at flowering time villous or pubescent

D. Leaves mostly spatulate, obovate or lance-elliptic (on vigorous shoots broader but usually longer than wide)

albicera Beadle. Fruit oblong, pale yellow, 8–9 mm. diameter.

arta Beadle. Fruit subglobose to short-ovoid, yellow-green and orange-red, about 10 mm. diameter.

bellica Sarg. Corymbs usually nearly or quite glabrous. Fruit characters as given above.[1]

Engelmannii Sarg. Fruit globose, bright orange-red, 8–10 mm. diameter.

Farwellii Sarg. Corymbs sometimes nearly or quite glabrous. Fruit characters as given above.

munita Sarg. Fruit subglobose or slightly longer than thick, scarlet, pale dotted, 8–9 mm. diameter.

operta Ashe. Corymbs usually glabrous or nearly so. Fruit characters as given above.

setosa Sarg. Corymbs usually nearly or quite glabrous. Fruit characters as given above.

signata Beadle. (?) Fruit oval or oblong, red, punctate, 9–10 mm. diameter. Color of anthers not given.

sinistra Beadle. Fruit oval, reddish, green or yellow, 6–8 mm. diameter.

tenuis Sarg. Corymbs glabrous or nearly so. Fruit characters as given above.

torva Beadle. Fruit subglobose, color not given, 7–9 mm. diameter.

DD. Leaves broader, mostly elliptic, oblong or oval (on vigorous shoots broadly oval to suborbicular)

[1] Referring in this as in the following instances to the characters given under the same species in one of the preceding subdivisions of this group.

fecunda Sarg. Corymbs usually glabrous or nearly so. Fruit characters as given above.

helderbergensis Sarg. Fruit short-oblong to obovoid, crimson, dotted, about 8 mm. diameter.

montivaga Sarg. Fruit short-oblong to ellipsoidal, orange-red, 6–7 mm. diameter.

palliata Sarg. Fruit subglobose, dark red, pale dotted, 10 mm. diameter.

persimilis Sarg. Corymbs sometimes glabrous or nearly so. Fruit characters as given above.

tetrica Beadle. Fruit subglobose, red or yellowish-green, about 10 mm. diameter.

triumphalis Sarg. Fruit oval or short-oblong, crimson or greenish-red, pale dotted, 8–10 mm. diameter.

vallicola Sarg. Fruit short-oblong, dull crimson blotched with green, pale dotted, 14–16 mm. diameter.

Warneri Sarg. Fruit ellipsoidal or subglobose, orange-red, 6–9 mm. diameter.

BB. Stamens about 20 (15–20)

C. Corymbs at flowering time glabrous or nearly so

D. Leaves of flowering branches mostly spatulate, obovate or lance-elliptic (on vigorous shoots broader but usually longer than wide)

Cocksii Sarg. Fruit short-oblong to slightly obovoid, crimson, 8–12 mm. diameter.

Fontanesiana Steud. Fruit short-oblong or oval, bright red, 8–10 mm. diameter.

leptophylla Sarg. Fruit short-oblong to slightly obovoid, light orange-red, 8–10 mm. diameter.

limnophylla Sarg. Fruit ellipsoidal, bright red, 6–7 mm. diameter.

phlebodia Sarg. Fruit short-oblong, dull scarlet blotched with green, pale dotted, 8–11 mm. diameter.

DD. Leaves of flowering branches broader, mostly elliptic, oblong or oval (on vigorous shoots broadly oval to suborbicular)

attenuata Ashe. Stamens usually 10; fruit characters as given above.

Bushii Sarg. Fruit short-oblong, green tinged with red, 6–8 mm. diameter.

cerasina Sarg. Fruit short-oblong, bright cherry-red, pale dotted, 8–10 mm. diameter. Stamens sometimes only 10.

intermixta Sarg. Fruit subglobose to slightly obovoid, dark orange-red, 10–12 mm. diameter.

lawrencensis Sarg. Stamens sometimes 15 or less. Fruit characters as given above.

Pennypackeri Sarg. Fruit oblong, bright crimson, pale dotted, 8–10 mm. diameter. Corymbs sometimes slightly villous.

persimilis Sarg. Fruit oblong to subglobose, dark crimson, dark dotted, about 11 mm. diameter. Corymbs sometimes slightly villous.

robusta Sarg. Fruit short-oblong to obovoid, crimson, pale dotted, 7–8 mm. diameter. Stamens sometimes only 10.

rotunda Sarg. Fruit subglobose to depressed-globose, light cherry-red, 13–15 mm. diameter.

sublobulata Sarg. Fruit short-oblong, subglobose or obovoid, orange-red, 6–7 mm. diameter.

tenuisepala Sarg. Stamens sometimes only 10–15. Fruit characters as given above.

CC. Corymbs at flowering time villous or pubescent

D. Leaves of flowering branches mostly spatulate, obovate or lance-elliptic (on vigorous shoots broader but usually longer than wide)

edita Sarg. Fruit short-oblong, dull green tinged with red, 6–8 mm. diameter.

limnophylla Sarg. Corymbs slightly villous or glabrous. Fruit characters as given above.

ohioensis Sarg. Fruit ellipsoidal or obovoid, reddish-green, dotted, 7–8 mm. diameter.

tersa Beadle. Fruit subglobose, color not given, 8–9 mm. diameter.

DD. Leaves broader, mostly elliptic, oblong or oval

Pennypackeri Sarg. Corymbs usually glabrous or nearly so. Fruit characters as given above.

persimilis Sarg. Cormbs sometimes glabrous or nearly so. Fruit characters as given above.

AA. Anthers salmon or yellowish flushed with pink; stamens about 10

B. Corymbs at flowering time glabrous

consueta Sarg. Fruit oval, orange-red, dark dotted, 8–10 mm. diameter.

tardiflora Sarg. Fruit short-oblong, dull red blotched with green, 10–12 mm. diameter.

BB. Corymbs at flowering time villous or pubescent

barbata Sarg. Fruit short-oblong to subglobose, dark red, pale dotted, 8–9 mm. diameter.

hirtella Sarg. Fruit subglobose to short-oblong, green tinged with red, about 10 mm. diameter.

AAA. Anthers white, cream or yellow

B. Stamens about 10 (5–12) (BB see p. 84)

C. Corymbs at flowering time glabrous or nearly so (CC see p. 84)

D. Leaves of flowering branches mostly obovate, spatulate, narrowly oblong or lance-elliptic (on vigorous shoots broader but usually longer than broad)

algens Beadle. Fruit subglobose or ovoid, dull red or green and red, 8–10 mm. diameter.

aliena Sarg. Fruit short-oblong to slightly obovoid, crimson, pale dotted, 9–10 mm. diameter.

arduennae Sarg. Fruit oblong, dull dark crimson, pale dotted, 8–10 mm. diameter.

armata Beadle. (?) Fruit globose, dull red, 5–8 mm. diameter. Color of anthers unknown.

barrettiana Sarg. Fruit subglobose to slightly obovoid, dull red or bronze, 10–12 mm. diameter.

Bartramiana Sarg. Fruit subglobose or slightly longer than thick, crimson, dark dotted, 8–10 mm. diameter. Corymbs sometimes villous,

collicola Ashe. (?) Fruit depressed-globose, orange-red or dull red, 8–11 mm. diameter. Color of anthers unknown.

eburnea Ashe. Fruit subglobose, dull dark red, about 13 mm. diameter.

helvina Ashe. (?) Fruit obovoid or subglobose, light red, 10–14 mm. diameter. Color of anthers unknown.

immitis Ashe. (?) Fruit globose, dark red or green mottled, 9–12 mm. diameter. Color of anthers unknown.

monosperma Sarg. Fruit oval to ovoid, dull red, pale dotted, 9–10 mm. diameter.

multispina Ashe. (?) Fruit oblong, dull red-brown, 7–9 mm. diameter. Color of anthers unknown.

pachyphylla Sarg. Fruit short-oblong, scarlet, dark dotted, 14–15 mm. diameter.

panda Ashe (not Beadle). (?) Fruit oval, dull red, 12–14 mm. long. Color of anthers unknown.

Parkae Sarg. Fruit oblong-ovoid, red, pale dotted, 8–9 mm. diameter.

rudis Sarg. Fruit oval to subglobose, scarlet, dark dotted, 8–10 mm. diameter.

severa Sarg. Fruit subglobose or depressed-globose, dark green tinged with red, 12–14 mm. diameter. (This species was described as having pink anthers, which was probably an error, as cultivated specimens and subsequent collections show anthers white or pale yellow.)

Stevensiana Sarg. Fruit short-oblong to slightly obovoid, green tinged with red, 4–5 mm. diameter.

tenuispina Sarg. Fruit subglobose to short-oblong, crimson, pale dotted, 9–10 mm. diameter.

truncata Sarg. Fruit short-oblong to slightly obovoid, crimson, pale dotted, 8–10 mm. diameter.

DD. Leaves of flowering branches broader, mostly obovate, elliptic or oblong (on vigorous shoots often suborbicular or broad as long)

acutifolia Sarg. Fruit oblong, bright scarlet, dark dotted, 8–10 mm. diameter.

efferta Sarg. Fruit short-oblong, broader than long, dark crimson, pale dotted, 12–13 mm. diameter.

erecta Sarg. Fruit short-oblong or subglobose, dull crimson, dark dotted, 7–10 mm. diameter.

Palmeri Sarg. Fruit subglobose, bright cherry-red, pale dotted, 8–9 mm. diameter.

phaenoneura Sarg. Fruit subglobose, dull red, 10–12 mm. diameter. Corymbs sometimes slightly villous.

regalis Beadle. Fruit oblong, color not given, about 8 mm. diameter.

rubrisepala Sarg. Fruit subglobose to short-oblong, orange-red, 7–8 mm. diameter.

CC. Corymbs at flowering time villous or pubescent

D. Leaves of flowering branches mostly obovate, spatulate, narrowly rhombic or lance-elliptic (on vigorous shoots broader but usually longer than broad)

Bartramiana Sarg. Corymbs usually glabrous or nearly so. Fruit characters as given above.

pilifera Sarg. Fruit short-oblong, dull red, pale dotted, 9–10 mm. diameter.

signata Beadle. (?) Fruit oval or oblong, red, punctate, 7–10 mm. diameter. Color of anthers unknown.

villiflora Sarg. Fruit short-oblong, green tinged with crimson, 8–9 mm. diameter.

DD. Leaves of flowering branches broader, mostly broadly-elliptic, oval or oblong

paradoxa Sarg. Fruit oblong or ovoid, red, dark dotted, 6–7 mm. diameter.

phaneroneura Sarg. Corymbs sometimes glabrous. Fruit characters as given above.

BB. Stamens about 20 (15–20)

C. Corymbs at flowering time glabrous or nearly so

D. Leaves of flowering branches relatively narrow, mostly obovate, spatulate, oblong or lance-elliptic (on vigorous shoots broader but usually distinctly longer than broad

araioclada Sarg. Fruit short-oblong, dull orange-red, 8–10 mm. diameter.

arborea Beadle. Fruit globose or subglobose, red or ruddy, 6–9 mm. diameter.

jasperensis Sarg. Fruit subglobose, crimson, pale dotted, 8–9 mm. diameter.

Mohrii Beadle. Fruit globose, red or greenish-red, black blotched, 7–9 mm. diameter. Corymbs sometimes slightly pilose.

polyclada Sarg. Fruit short-oblong or slightly ovoid, orange-red, pale dotted, 8–10 mm. diameter.

uniqua Sarg. Fruit short-oblong, dull red, 7–8 mm. diameter.

DD. Leaves of flowering branches broader, mostly elliptic, oval or oblong (on vigorous shoots often suborbicular or broad as long)

effulgens Sarg. Fruit short-oblong, scarlet, pale dotted, 10–12 mm. diameter.

insignis Sarg. Fruit subglobose, dull dark red, pale dotted, 14–15 mm, diameter. Corymbs sometimes slightly villous.

CC. Corymbs at flowering time villous or pubescent

D. Leaves of flowering branches relatively narrow, mostly obovate, spatulate, oblong or lance-elliptic (on vigorous shoots broader but usually distinctly longer than broad

berberifolia T. & G. Fruit subglobose, orange, or reddish, 12–14 mm. diameter.

crocina Beadle. Fruit oval or oblong, yellow, 8–11 mm. diameter.

edura Beadle. Fruit subglobose, orange-yellow or tinged with red, 8–9 mm. diameter.

fera Beadle. Fruit globose or subglobose, bright red or scarlet, about 10 mm. diameter.

Mohrii Beadle. Corymbs usually glabrous or nearly so. Fruit characters as given above.

persistens Sarg. Fruit subglobose or short-oblong, crimson, dark dotted, about 15 mm. diameter.

subpilosa Sarg. Fruit subglobose or short-oblong, dull orange-red, 8–10 mm. diameter.

DD. Leaves of flowering branches broader, mostly oval, oblong or elliptic (on vigorous shoots often as broad as long, very large)

insignis Sarg. Corymbs usually glabrous or nearly so. Fruit characters as given above.

II. Punctatae

A. Anthers red, rose or pink (AA see p. 87)

B. Stamens about 10 (5–15)

C. Corymbs glabrous or nearly so

calvescens Sarg. Fruit subglobose, dark red, dark dotted, about 15 mm. diameter. Stamens sometimes 20.

cuneiformis Egglest. Fruit ellipsoid-pyriform, scarlet or dark red, about 10 mm. diameter. Corymbs sometimes slightly pubescent and stamens 10–20.

glabrifolia Sarg. (?) Fruit subglobose, angular, greenish red, dark dotted, 10–12 mm. diameter. Color of anthers unknown.

incerta Sarg. Fruit subglobose or short-oblong, crimson, 8–10 mm. diameter.

praestans Sarg. Fruit short-oblong to oval, dark red, minutely dark dotted, 8–10 mm. diameter.

pratensis Sarg. Fruit globose, bright scarlet, about 10 mm. diameter. Corymbs sometimes slightly pubescent.

sauratonae Ashe. (?) Fruit red, about 12 mm. diameter, shape not described. Number of stamens and color of anthers unknown.

tenax Ashe. Fruit subglobose, scarlet or mottled with yellow or olive, 14–15 mm. diameter. Stamens sometimes 20.

CC. Corymbs distinctly pubescent or villous

Brownietta Sarg. Fruit subglobose to slightly obovoid, crimson, pale dotted, about 15 mm. diameter.

cuneiformis Egglest. Corymbs usually glabrous. Fruit characters as given above.

desueta Sarg. Fruit short-oblong, scarlet, pale dotted, 8–10 mm. diameter.

pausiaca Ashe. Fruit oblong or slightly pyriform, crimson, 10–15 mm. diameter.

porrecta Ashe. Fruit globose or slightly oblong, dull red, 11–14 mm. diameter.

praestans Sarg. Corymbs usually glabrous or nearly so. Fruit characters as given above.

BB. Stamens about 20 (12–20)

C. Corymbs glabrous or nearly so

barbara Sarg. Fruit oblong-obovoid, crimson, 8–10 mm. diameter.

calvescens Sarg. Stamens sometimes only 10. Fruit characters as given above.

compacta Sarg. Fruit short-oblong, orange-red, pale dotted, 9–10 mm. diameter.

Dewingii Sarg. Fruit short-oblong, crimson, pale dotted, 10–12 mm. diameter.

Eastmaniana Sarg. Fruit short-oblong to slightly obovoid, dark crimson, pale dotted, 10–12 mm. diameter.

grandis Ashe. Fruit globular, bright crimson, 11–14 mm. diameter. Corymbs sometimes minutely pubescent.

limatula Sarg. Fruit short-oblong to subglobose, crimson, pale dotted, about 15 mm. diameter.

nitidula Sarg. Fruit short-oblong, dark yellow blotched with red, dark dotted, 10–12 mm. diameter.

notabilis Sarg. Fruit short-oblong to slightly obovoid, orange-red, dark dotted, 7–8 mm. diameter.

sauratonae Ashe.? Floral characters unknown. Fruit as described above.

silvestris Sarg. Fruit subglobose or short-oblong, dull orange-red, about 10 mm. diameter. Corymbs usually slightly villous.

suborbiculata Sarg. Fruit subglobose or rather longer than broad, dull red blotched with green, 12–15 mm. diameter.

tenax Ashe. Stamens sometimes 10–15. Fruit characters as given above.

umbratilis Sarg. Fruit short-oblong to subglobose, bright apple-green (unripe?), about 10 mm. diameter.

CC. Corymbs distinctly villous or pubescent

angustata Sarg. Fruit subglobose or depressed-globose, crimson blotched with green, pale dotted, 12–14 mm. diameter.

brazoria Sarg. Fruit subglobose or longer than broad, bright canary-yellow, dark blotched, about 10 mm. diameter.

celsa Sarg. Fruit subglobose, crimson, pale dotted, 8–9 mm. diameter.

dallasiana Sarg. Fruit subglobose, dark dull red, 9–10 mm. diameter.

Eatoniana Sarg. Fruit subglobose to depressed-globose, bright cherry-red, 10–12 mm. diameter.

florifera Sarg. Fruit short-oblong, crimson with pale lenticles, 10–12 mm. diameter.

grandis Ashe. Corymbs sometimes glabrous. Fruit characters as given above.

indicens Ashe. (?) Fruit globose, dark dull red, olive mottled, 13–15 mm. diameter. Color of anthers unknown.

punctata Jacq. Fruit short-oblong to subglobose, dull red (yellow in var. aurea), pale dotted, 13–20 mm. diameter.

recedens Sarg. Fruit subglobose or slightly obovoid, dark red, green blotched or russet, scarcely punctate, 11–15 mm. diameter.

silvestris Sarg. Corymbs sometimes nearly glabrous. Fruit characters as given above.

sordida Sarg. Fruit subglobose, dark dull red, 10–12 mm. diameter.
verruculosa Sarg. Fruit subglobose, dark red, 12–16 mm. diameter.

AA. Anthers white, cream or yellow
B. Stamens about 10 (5–15)
C. Corymbs glabrous or nearly so

glabrifolia Sarg. (?) Color of anthers unknown. Fruit characters as given above.
sauratonae Ashe. (?) Color of anthers unknown. Fruit characters as given above.

CC. Corymbs villous or pubescent

hirtiflora Sarg. Fruit subglobose or depressed-globose, crimson blotched with green or pale lenticles, 15–16 mm. diameter.
incaedua Sarg. Fruit short-oblong, yellowish-red, pale dotted, 8–9 mm. diameter.
latebrosa Sarg. Characters of mature fruit not known.
Lettermanii Sarg. Fruit subglobose or depressed-globose, dark red with pale lenticles, 14–16 mm. diameter.
macropoda Sarg. Fruit subglobose or short-oblong, crimson, pale dotted, 8–10 mm. diameter.
secta Sarg. Fruit subglobose, crimson, pale dotted, 10–12 mm. diameter. Stamens usually only 5–8.

BB. Stamens about 20 (12–20)
C. Corymbs glabrous or nearly so

fastosa Sarg. Fruit subglobose or short-oblong, dull orange-red, pale dotted, 9–10 mm. diameter.
sauratonae Ashe. (?) Color of anthers and number of stamens unknown. Fruit characters as given above.

CC. Corymbs villous or pubescent

amnicola Beadle. Fruit subglobose, red, 7–10 mm. diameter.
collina Chapm. Fruit globose, dull red, about 10 mm. diameter.
indicens Ashe. (?) Color of anthers unknown. Fruit characters as given above.
punctata var. aurea Ait. Fruit short-oblong to subglobose, yellow, 13–20 mm. diameter.
rigens Beadle. Fruit subglobose or slightly pyriform, red, 9–12 mm. diameter.
succincta Sarg. Fruit subglobose, orange-red, 7–9 mm. diameter.
sucida Sarg. Fruit subglobose, bright red, 8–12 mm. diameter.
vicina Sarg. Fruit subglobose or slightly longer than wide, 10–12 mm. diameter.

III. Virides

A. Anthers pink, rose or purple
B. Corymbs glabrous

antimima Sarg. Fruit subglobose or slightly obovoid, dark orange-red, 7–8 mm. diameter. Corymbs sometimes slightly villous.

arborescens Ell. Fruit subglobose, orange-red, 5–7 mm. diameter. Corymbs sometimes villous.

durifolia Ashe. (?) Fruit globular, dull red, 8–10 mm. diameter. Color of anthers unknown.

enucleata Sarg. Fruit subglobose to short-oblong, orange-red, 7–8 mm. diameter.

Pechiana Sarg. Fruit subglobose or slightly broader than long, orange-red, 8–9 mm. diameter.

penita Beadle. Fruit globose or depressed-globose, red, 8–10 mm. diameter

Schneckii Ashe. (?) Fruit nearly globular, bright red, about 8 mm. diameter. Color of anthers unknown.

sutherlandensis Sarg. Fruit subglobose, orange-red, 7–8 mm. diameter.

BB. Corymbs villous or pubescent

antimima Sarg. Corymbs sometimes glabrous. Fruit characters as given above.

ingens Beadle. Fruit globose or subglobose, red, 7–9 mm. diameter.

micracantha Sarg. Fruit subglobose to short-oblong, bright orange-red. about 7 mm. diameter.

paludosa Sarg. Fruit subglobose or short-oblong, orange-red, dark dotted, 5–8 mm. diameter.

stenosepala Sarg. Fruit ellipsoidal to slightly obovoid, orange-red, 5–6 mm. diameter.

subviridis Beadle. (?) Fruit globose, color not described, 5–7 mm. diameter. Color of anthers unknown.

AA. Anthers cream-white or yellow

B. Corymbs glabrous

abbreviata Sarg. Fruit subglobose, dark red, 6–8 mm. diameter. Corymbs usually slightly villous.

atrorubens Ashe. Fruit globular, dark red, 9–11 mm. diameter.

blanda Sarg. Fruit subglobose to short-oblong, bright orange-red, pale dotted, about 8 mm. diameter.

durifolia Ashe. (?) Color of anthers unknown. Fruit characters as given above.

glabriuscula Sarg. Fruit oblong to obovoid, dull orange-color with dark lenticles, 5–8 mm. diameter.

interior Beadle. Fruit globose, bright red, 7–8 mm. diameter.

lanceolata Sarg. Fruit short-oblong to slightly obovoid, dark red, 6–7 mm. diameter.

larga Sarg. Fruit obovoid, scarlet, pale dotted, 7–8 mm. diameter.

ludoviciensis Sarg. Fruit short-oblong, crimson, 9–10 mm. diameter.

lutensis Sarg. Fruit orange-red, dark dotted, 4–5 mm. diameter.

mitis Sarg. Fruit subglobose to short-oblong, dark crimson, dark dotted, 10–12 mm. diameter.

nitens Sarg. Fruit subglobose, orange-red, 6–8 mm. diameter.

nitida Sarg. Fruit oblong, dull brick-red with dark lenticles, 8–15 mm. diameter.

ovata Sarg. Fruit subglobose or slightly longer than broad, orange-red, 5–6 mm. diameter.

Schneckii Ashe. (?) Color of anthers unknown. Fruit characters as given above.

tripartita Sarg. Fruit short-oblong, yellow-green, 5–8 mm. diameter.

viridis L. Fruit subglobose or depressed-globose, bright scarlet or orange, 4–5 mm. diameter.

BB. Corymbs villous or pubescent

abbreviata Sarg. Corymbs sometimes glabrous. Fruit characters as given above.

amicalis Sarg. Fruit subglobose, dull red, 6–8 mm. diameter.

antiplasta Sarg. Fruit subglobose, scarlet, 7–8 mm. diameter.

atrorubens Ashe. Corymbs sometimes glabrous. Fruit characters as given above.

Dawsoniana Sarg. Fruit obovoid, orange-red, 8–10 mm. diameter.

poliophylla Sarg. Fruit globose to short-oblong or ovoid, orange-red, 6–7 mm. diameter.

subviridis Beadle. (?) Color of anthers unknown. Fruit characters as given above.

velutina Sarg. Fruit subglobose, orange-red, pale dotted, 6–7 mm. diameter.

IV. Pulcherrimae

A. Anthers rose or purple

abstrusa Beadle. Fruit oval or short pyriform, color not given, 7–9 mm. diameter.

ancisa Beadle. Fruit globose or subglobose, red or ruddy, 10–12 mm. diameter.

assimilis Beadle. Fruit globose, color not described, 7–9 mm. diameter.

austrina Beadle. Fruit globose, green or greenish-yellow, about 10 mm. diameter.

concinna Beadle. Fruit subglobose, color not described, 7–8 mm. diameter.

contrita Beadle. Fruit subglobose yellow-green or orange, 7–9 mm. diameter.

illustris Beadle. Fruit depressed globose, color not described, about 10 mm. diameter.

incilis Beadle. Fruit subglobose, red or red and green, 7–9 mm. diameter.

opima Beadle. Fruit globose, bright red, 5–8 mm. diameter.

pinetorum Beadle. Fruit subglobose, red or ruddy, 7–10 mm. diameter.

pulcherrima Ashe. Fruit oval, yellow-green, 6–8 mm. diameter.

AA. Anthers cream or yellow

lenis Beadle. Fruit oval or subpyriform, red or ruddy, 6–8 mm. diameter.

V. Intricatae

A. Anthers pink, rose or purple (AA see p. 91)
B. Stamens about 10 (7–12) (BB see p. 91)
C. Leaves at flowering time glabrous or nearly so

Bealii Sarg. Fruit short-oblong to subglobose, dark orange-red, dark dotted, about 10 mm. diameter. Stamens sometimes 16 or more.

Bissellii Sarg. Fruit pyriform, dull orange-red or green tinged, 9–10 mm. diameter.

Buckleyi Beadle. Fruit sugblobose angled, red or russet-red, 8–12 mm. diameter.

Darlingtoniana Sarg. (?) Fruit short-oblong to depressed-globose, bright canary yellow, 12–14 mm. diameter. Flowers unknown.

definita Sarg. Fruit subglobose to short-oblong, greenish or greenish-yellow, about 10 mm. diameter. Young leaves sometimes slightly scabrate above.

diversifolia Sarg. Fruit obovoid, bright orange, dark dotted, 8–9 mm. diameter.

fortunata Sarg. Fruit short-oblong to slightly obovoid, bright canary-yellow, dark dotted, 12–14 mm. diameter.

fulva Sarg. Fruit globose or oblong-globose, red or orange, bronze tinged. Leaves sometimes slightly scabrate.

Hargeri Sarg. Fruit obovoid, dull orange-green, 10–12 mm. diameter.

inducta Ashe. Fruit globose or obovoid, dull green or russet, 8–10 mm. diameter.

Jenningsii Sarg. Fruit depressed-ovoid to short-oblong, russet-green, dark russet-red or bronze, 13–16 mm. diameter.

leioclada Sarg. Fruit subglobose to short-oblong, green or flushed with red, 10–12 mm. diameter.

luteola Sarg. Fruit subglobose to short-obovoid, light canary-yellow, 8–10 mm. diameter.

meticulosa Sarg. Fruit short-oblong to ovoid, orange-red, dark dotted, 10–12 mm. diameter.

neobushii Sarg. Fruit short-oblong to subglobose, orange-red, dark dotted, 10–12 mm. diameter.

padifolia Sarg. Fruit short-oblong, orange-red, dark dotted, 12–15 mm. diameter. Anthers described as yellow flushed with pink.

pagensis Sarg. Fruit short-oblong to slightly obovoid, dull orange-brown, about 10 mm. diameter.

Paineriana Sarg. Fruit subglobose to short-oblong, orange or orange-red, about 12 mm. diameter.

pygmaea Sarg. Fruit oblong-obovoid, dark crimson, pale dotted, 8–11 mm. diameter.

Schweinitziana Sarg. Fruit oblong, dark red, 8–9 mm. diameter.

straminea Beadle. Fruit pyriform, yellowish-green, 9–11 mm. diameter.

CC. Leaves at flowering time scabrate or villous above.

communis Beadle. Fruit globose or subglobose, red, 9–13 mm. diameter.

definita Sarg. Leaves sometimes glabrous above. Fruit characters as given above.

fulva Sarg. Leaves sometimes glabrous above. Fruit characters as given above.

infera Sarg. Fruit obovoid, dark reddish-orange, dark dotted, 10–11 mm. diameter.

minutiflora Sarg. Fruit short-oblong or subglobose, dull orange or orange and green with pale lenticles, about 10 mm. diameter.

Peckii Sarg. Fruit subglobose to short-oblong or ovoid, light yellow-green or red tinged, dark dotted, 8–10 mm. diameter.

scabra Sarg. Fruit subglobose or short-oblong, green, about 12 mm. diameter.

Stonei Sarg. Fruit obovoid, light yellow or greenish-yellow, 12–14 mm. diameter.

BB. Stamens about 20 (15–20)

C. Leaves at flowering time glabrous or nearly so

Bealii Sarg. Stamens usually about 10. Fruit characters as given above.

Darlingtoniana Sarg. (?) Flowers unknown; fruit characters as given above.

gilva Beadle. Fruit subglobose or short-pyriform, yellow or greenish-yellow, 6–8 mm. diameter.

gratiosa Sarg. Fruit short-oblong or slightly obovoid, green blotched with red, 8–10 mm. diameter. Young leaves sometimes slightly villous above.

macilenta Beadle. Fruit globose or subglobose, red, 7–9 mm. diameter.

mendosa Beadle. Fruit globose or subglobose, red, 8–10 mm. diameter.

pallens Beadle. Fruit subglobose to oval, yellow or greenish-yellow, 8–11 mm. diameter.

Sargentii Beadle. Fruit globose or subglobose, yellow or orange-yellow, flushed with red, 10–13 mm. diameter.

tecta Beadle. Fruit globose, red, 10–13 mm. diameter.

CC. Leaves at flowering time scabrate or villous

gratiosa Sarg. Young leaves sometimes glabrous or nearly so. Fruit characters as given above.

Harveyana Sarg. Fruit subglobose, orange, about 10 mm. diameter.

AA. Anthers white, cream or yellow

B. Stamens about 10 (7–15) (BB see p. 93)

C. Leaves at flowering time glabrous or nearly so

apposita Sarg. Fruit oblong-obovoid, reddish-green or yellowish-bronze, 9–11 mm. diameter.

Bartoniana Sarg. Fruit subglobose to short-oblong, dark crimson or blotched with green, 10–12 mm. diameter.

Boyntonii Beadle. Fruit globose or subglobose, yellow-green flushed with red, 10–15 mm. diameter.

cornellii Sarg. Fruit obovoid, light orange-yellow, dark dotted, 10–12 mm. diameter.

cuprea Sarg. Fruit subglobose to short-oblong, russet or dark red, 8–9 mm. diameter.

Darlingtoniana Sarg. (?) Flowers unknown. Fruit characters as given above.

flavida Sarg. Fruit subglobose to short-oblong, dull yellow or orange-yellow tinged with red, 10–12 mm. diameter.

foetida Ashe. Fruit subglobose, dull olive-green, red or russet mottled, 11–14 mm. diameter.

fructuosa Sarg. Fruit depressed-globose, deep orange-red, about 12 mm. diameter.

intricata Lange. Fruit subglobose to ellipsoidal, 7–9 mm. diameter.

Kinzerae Sarg. Fruit oblong-obovoid, russet-orange or red tinged, 10–12 mm. diameter.

lentula Sarg. Fruit depressed-globose, deep dull red, about 13 mm. diameter.

nemoralis Sarg. Fruit subglobose or slightly obovoid, bright clear red, about 10 mm. diameter.

neocanbyi Sarg. Fruit subglobose to short-oblong, dull orange to reddish-orange, dark dotted, 12–15 mm. diameter.

padifolia Sarg. Stamens described as yellow flushed with pink (usually pink). Fruit characters as given above.

pusilla Sarg. Fruit short-oblong, crimson blotched with green, dark dotted, 12–14 mm. diameter. Leaves sometimes slightly scabrous above.

resecta Ashe. Fruit globular, bright scarlet, 14–17 mm. diameter.

reses Ashe. Fruit subglobose, dark red or mottled with russet or green, 15–16 mm. diameter. Young leaves sometimes slightly scabrous.

sexatilis Sarg. Fruit short-oblong, dark orange or reddish-orange, dark dotted, 9–10 mm. diameter.

stellata Sarg. Fruit subglobose, dull reddish-green, 11–13 mm. diameter.

tenuissima Sarg. Fruit obovoid, dull red, 8–10 mm. diameter.

Twiningii Sarg. Fruit short-oblong to subglobose, green tinged with red, 10–12 mm. diameter.

verecunda Sarg. Fruit oblong to oblong-obovoid, crimson, about 7 mm. diameter.

virgata Ashe. Fruit depressed-globose, russet-red dotted with green and orange, 12–16 mm. diameter.

CC. Leaves at flowering time scabrate or villous above

abjecta Sarg. Fruit subglobose or slightly longer than wide, greenish-orange, about 15 mm. diameter.

alpista Sarg. Fruit ovoid, dull red blotched with green, 10–12 mm. diameter.

biltmoreana Beadle. Fruit depressed-globose, green, yellow or orange, 10–15 mm. diameter.

callista Sarg. Fruit oblong, orange-red, 8–9 mm. diameter.

confusa Sarg. Fruit short-oblong to subglobose, russet-green or tinged with red, 12–17 mm. diameter.

contortula Sarg. Fruit subglobose, green blotched with red, about 10 mm. diameter.

Delosii Sarg. Fruit short-oblong to slightly obovoid, orange tinged with red, pale dotted, 10–12 mm. diameter.

modesta Sarg. Fruit subglobose, rarely oblong or pyriform, bright yellow or orange-red, dark mottled, 8–9 mm. diameter.

premora Ashe. Fruit globose, bright green, dark mottled, 10–12 mm. diameter.

pusilla Sarg. Leaves usually glabrous or nearly so. Fruit characters as given above.

reses Ashe. Young leaves usually glabrous or nearly so. Fruit characters as given above.

villicarpa Sarg. Fruit short-oblong to subglobose, orange yellow or tinged with red, pale dotted, 10–12 mm. diameter.

BB. Stamens about 20 (15–20)

C. Leaves at flowering time glabrous or nearly so

alma Beadle. Fruit subglobose, red, 10–12 mm. diameter.

Darlingtoniana Sarg. (?) Flowers unknown. Fruit characters as given above.

eximia Beadle. Fruit globose, red, 8–10 mm. diameter.

inanis Beadle. Fruit short-oval or slightly pyriform, red or ruddy, 6–8 mm. diameter.

venusta Beadle. Fruit oval, greenish-red, dull red or bright red, 9–13 mm. diameter.

CC. Leaves at flowering time scabrate or villous above

Craytonii Beadle. Fruit oblong to obovoid, red or ruddy, 9–12 mm. diameter.

VI. Tenuifoliae

Anthers red, rose, pink or purple in this group.

A. Stamens normally 10 or less (AA see p. 97)

B. Leaves of flowering branches narrowed or attenuate at base (on vigorous shoots rounded to truncate) (BB see p. 95)

C. Corymbs glabrous or nearly so (CC see p. 95)

acuminata Sarg. Fruit short-oblong to subglobose, crimson, 8–9 mm. diameter.

acutiloba Sarg. Fruit oblong to obovoid, bright scarlet, 8–10 mm. diameter.

angustisepala Sarg. Fruit short-oblong to slightly obovoid, scarlet, about 10 mm. diameter.

antheina Sarg. Fruit short-oblong, scarlet, pale dotted, 9–12 mm. diameter.

apiomorpha Sarg. Fruit obovoid, rarely short-oblong, bright reddish-purple, pale dotted, 8–12 mm. diameter. Corymbs sometimes slightly villous.

ascendens Sarg. Fruit oblong or oblong-obovoid, dark crimson, 8–9 mm. diameter.

bella Sarg. Fruit short-oblong to slightly obovoid, scarlet, 8–9 mm. diameter.

Boothiana Sarg. Fruit short-oblong, bright orange, pale dotted, 8–9 mm. diameter.

Collinsiana Sarg. Fruit short-oblong, dark crimson, about 8 mm. diameter.

colorata Sarg. Fruit obovoid, crimson, pale dotted, about 12 mm. diameter.

crudelis Sarg. Fruit oblong, crimson, pale dotted, 9–10 mm. diameter. Corymbs sometimes slightly villous.

culta Sarg. Fruit short-oblong, ovoid or subglobose, crimson, pale dotted, 9–10 mm. diameter.

cyanophylla Sarg. Fruit subglobose to short-oblong, reddish-purple with pale lenticles, 9–15 mm. diameter.

delucida Sarg. Fruit oblong, bright scarlet, 9–10 mm. diameter. Leaves of terminal shoots sometimes subcordate.

Eganii Ashe. Fruit bright red, oblong, 8–13 mm. diameter.

exigua Ashe. Fruit obovoid, bright scarlet, 10–12 mm. diameter.

firma Sarg. Fruit short-oblong to obovoid, crimson, 10–12 mm. diameter.

flammata Sarg. Fruit short-oblong, scarlet, pale dotted, 8–10 mm. diameter.

florea Sarg. Fruit oblong, scarlet, 10–12 mm. diameter.

glaucophylla Sarg. Fruit short-oblong, rarely ovoid, bright scarlet, about 10 mm. diameter.

Gruberi Ashe. Fruit globular-pyriform, light green with russet or scarlet blotches, about 11 mm. diameter.

Hadleyana Sarg. Fruit short-oblong, scarlet, pale dotted, 9–10 mm. diameter. Corymbs sometimes slightly villous.

leptopoda Sarg. Fruit obovoid, bright cherry-red, pale dotted, 8–9 mm. diameter.

longipetiolata Sarg. Fruit oblong-obovoid, dark red, 8–9 mm. diameter.

marcida Ashe. Fruit depressed-globose, dark crimson, 13–15 mm. diameter.

merita Sarg. Fruit short-oblong to slightly obovoid, crimson, blotched with green and pale dotted, 9–10 mm. diameter.

miniata Ashe. Fruit oblong, scarlet or mottled with olive or russet, 9–13 mm. diameter.

nescia Sarg. Fruit short-oblong or slightly obovoid, scarlet, pale dotted, 9–10 mm. diameter.

pallidula Sarg. Fruit short-oblong, scarlet, 7–8 mm. diameter.

parviflora Sarg. Fruit oblong-obovoid, crimson, pale dotted, about 10 mm. diameter.

pastorum Sarg. Fruit oblong, bright scarlet with pale lenticles, about 10 mm. diameter. Stamens sometimes 20.

paucispina Sarg. Fruit pyriform or globose-pyriform, crimson or purplish, pale dotted, 12–15 mm. diameter.

pentandra Sarg. Fruit dark crimson with pale lenticles, 12–15 mm. diameter.

perlaevis Ashe. Fruit pyriform, obovoid or rarely oblong, dark dull red blotched with orange or russet, 8–12 mm. diameter.

porracea Ashe. (?) Fruit oblong, dark red, 10–13 mm. diameter.

propinqua Ashe. Fruit globose, green, russet and dull red, 12–13 mm. diameter.

pumila Sarg. Fruit oblong, dark red, 8–10 mm. diameter.

rubrocarnea Sarg. Fruit short-oblong to subglobose, scarlet, dark dotted, 12–14 mm. diameter. Corymbs sometimes slightly villous.

saturata Sarg. Fruit short-oblong to subglobose, dark red, about 10 mm. diameter.

sequax Ashe. Fruit globose or subglobose, dark red or crimson blotched with green or russet, 12–15 mm. diameter.

serena Sarg. Fruit oblong, scarlet with pale lenticles, about 10 mm. diameter.

siderea Sarg. Fruit obovoid, yellow-green, becoming dark red, 9–10 mm. diameter.

suavis Sarg. Fruit short-oblong, orange-red, pale dotted, 8–9 mm. diameter.

tarda Sarg. Fruit oblong to subglobose, bright scarlet with pale lenticles, becoming crimson, 11–14 mm. diameter. Stamens sometimes 15–20.

tenuifolia Britton. Fruit pyriform, 8–9 mm. diameter. Color not described.

viridimontana Sarg. Fruit short-oblong, crimson, pale dotted, about 10 mm. diameter.

Wootoniana Egglest. (?) Fruit ellipsoidal, red, 6–10 mm. diameter. Color of anthers not described.

CC. Corymbs sometimes slightly villous

apiomorpha Sarg. Fruit characters as given above.

crudelis Sarg. Fruit characters as given above.

Hadleyana Sarg. Fruit characters as given above.

rubrocarnea Sarg. Fruit characters as given above.

BB. Leaves of flowering branches mostly not conspicuously narrowed at base, rounded to truncate (on vigorous shoots truncate to cordate)

C. Corymbs glabrous

blandita Sarg. Fruit oblong, scarlet with pale lenticles, 8–9 mm. diameter.

brumalis Ashe. Fruit subglobose, dull, rather dark red, green mottled, 10–12 mm. diameter.

Claytoniana Sarg. Fruit subglobose to short-oblong, scarlet, about 10 mm. diameter.

condensa Sarg. Fruit obovoid, yellowish-red, 8–10 mm. diameter.

Damei Sarg. Fruit oblong to obovoid, bright cherry-red, minutely dotted, about 8 mm. diameter.

demissa Sarg. Fruit short-oblong to subglobose or slightly obovoid, scarlet, 8–9 mm. diameter.

dissimilis Sarg. Fruit short-oblong to obovoid dull red, becoming dark red, about 12 mm. diameter.

fucata Sarg. Fruit short-oblong to oval, crimson, 8–9 mm. diameter.

fucosa Sarg. Fruit oblong, scarlet, pale dotted, 9–12 mm. diameter.

genialis Sarg. Fruit oblong, dark crimson, pale dotted, 8–10 mm. diameter.

gracilipes Sarg. Fruit narrow-obovoid, scarlet, 6–7 mm. diameter.

Habereri Sarg. Fruit oval to obovoid, crimson, pale dotted, about 5 mm. diameter.

heidelbergensis Sarg. Fruit obovoid, rarely short-oblong or globose, scarlet, blotched with russet, pale dotted, 12–15 mm. diameter.

ignea Sarg. Fruit short-oblong, scarlet, pale dotted, 8–9 mm. diameter.

insignata Sarg. Fruit short-oblong, dull red, 8–9 mm. diameter.

insolita Sarg. Fruit broad-ovoid, bright cherry-red, dark dotted, 12–13 mm. diameter.

lata Sarg. Fruit oblong, bright scarlet, about 7 mm. diameter.

macrosperma Ashe. Fruit somewhat longer than thick, dark but bright red, 13–18 mm. diameter.

matura Sarg. Fruit oblong, bright scarlet with pale lenticles, 12–15 mm. diameter.

media Sarg. Fruit obovoid, scarlet, 8–10 mm. diameter.

modica Sarg. Fruit globose, bright crimson, 8–10 mm. diameter.

monstrata Sarg. Fruit oblong, scarlet, pale dotted, 9–10 mm. diameter.

Moyeriana Sarg. Fruit obovoid to short-oblong, cherry-red, dark dotted, 10–11 mm. diameter.

multifida Ashe. (?) Fruit oblong, crimson, 9–11 mm. diameter.

Napaea Sarg. Fruit oblong-obovoid, dull red, 8–9 mm. diameter.

ornata Sarg. Fruit oblong, scarlet, 9–10 mm. diameter.

otiosa Ashe. Fruit oblong, russet becoming scarlet, 8–10 mm. diameter.

pactilis Ashe. (?) Fruit obovoid, scarlet, orange or russet, 11–12 mm. diameter.

Paddockii Sarg. Fruit short-oblong to obovoid, scarlet, 8–10 mm. diameter.

Paineana Sarg. Fruit long-obovoid, scarlet, pale dotted, about 10 mm. diameter.

parca Ashe. (?) Fruit globose or slightly oblong, scarlet-mottled with orange, about 10 mm. diameter.

perlaeta Sarg. Fruit short-oblong to slightly obovoid, scarlet, pale dotted, 8–9 mm. diameter.

populnea Ashe. Fruit globular or oblong, dull red mottled with green, russet and scarlet, about 14 mm. diameter.

propensa Sarg. Fruit short-oblong, scarlet, pale dotted, 8–10 mm. diameter.

Randiana Sarg. Fruit oblong, scarlet, pale dotted, 8–9 mm. diameter.

recta Sarg. Fruit short-oblong, scarlet, pale dotted, 8–9 mm. diameter.

retrusa Ashe. Fruit obovoid or oblong, orange-scarlet, 8–10 mm. diameter.

roanensis Ashe. Fruit oblong, bright red, about 8 mm. diameter.

rubicunda Sarg. Fruit oblong, scarlet, pale dotted, about 8 mm. diameter. Corymbs sometimes slightly villous.

rufipes Ashe. Fruit oblong, scarlet mottled with green or russet, 9–11 mm. diameter.

sarniensis Sarg. Fruit short-oblong, light orange-red, pale dotted, 7–8 mm. diameter.

sextilis Sarg. Fruit subglobose to short-oblong, scarlet, 12–14 mm. diameter.

Slavinii Sarg. Fruit short-oblong or slightly obovoid, bright orange-red, pale dotted, about 10 mm. diameter.

spatifolia Sarg. Fruit short-oblong, crimson, pale dotted, 8–9 mm. diameter.

Streeterae Sarg. Fruit oblong, scarlet, pale dotted, about 8 mm. diameter.

tenella Ashe. Fruit oblong, dark orange, scarlet or mottled, 9–10 mm. diameter. Leaves sometimes narrowed at base.

tenera Ashe. Fruit oblong, bright scarlet, 9–10 mm. diameter.

tenuiloba Sarg. Fruit oblong-obovoid, scarlet, about 10 mm. diameter.

trachyphylla Sarg. Fruit obovoid, crimson, pale dotted, 12–15 mm. diameter.

vittata Ashe. Fruit subglobose or short-cylindric, red-scarlet blotched with olive or russet, 14–18 mm. diameter.

CC. Corymbs villous at flowering time

rubicunda Sarg. Corymbs sometimes nearly or quite glabrous. Fruit characters as given above.

uber Ashe. Fruit oblong, dark, dull red mottled with orange, 12–15 mm. diameter.

AA. Stamens 15–20 (rarely less)

B. Leaves of flowering branches usually narrowed or attenuate at base (on vigorous shoots rounded or truncate)

C. Corymbs glabrous at flowering time

alnorum Sarg. Fruit oblong-obovoid, bright scarlet, about 8 mm. diameter.

asperata Sarg. Fruit obovoid to short-oblong, scarlet, pale dotted, 14–16 mm. diameter. Corymbs sometimes slightly villous.

basilica Beadle. Fruit subglobose, red, 12–15 mm. diameter.

conferta Sarg. Fruit short-oblong, orange-red, pale dotted, about 8 mm. diameter.

decens Ashe. Fruit oblong, subglobose or slightly obovoid, scarlet or orange spotted, 10–12 mm. diameter.

depilis Sarg. Fruit subglobose to broad-obovoid, dark red to reddish-purple, 12–15 mm. diameter.

Edsonii Sarg. Fruit subglobose to short-oblong or obovoid, bright cherry-red, pale dotted, 13–15 mm. diameter.

lucorum Sarg. Fruit pear-shaped, becoming oblong or obovoid, crimson with pale lenticles, 12–15 mm. diameter. Corymbs sometimes slightly villous.

luminosa Sarg. Fruit obovoid, crimson, pale dotted, 10–12 mm. diameter.

mellita Sarg. Fruit oblong or oblong-obovoid, bright scarlet, 8–9 mm. diameter.

pastorum Sarg. Stamens sometimes 5–10. Fruit characters as given above.

taetrica Sarg. Fruit oval, scarlet-yellow, blotched and pale dotted, 9–10 mm. diameter.

tarda Sarg. Stamens sometimes 10 or less. Fruit characters as given above.

CC. Corymbs villous at flowering time

asperata Sarg. Corymbs sometimes nearly or quite glabrous. Fruit characters as given above.

lucorum Sarg. Corymbs sometimes glabrous or nearly so. Fruit characters as given above.

BB. Leaves of flowering branches not usually narrowed at base (on vigorous shoots truncate or cordate). Corymbs glabrous

Schuettei Ashe. Fruit subglobose or globular-pyriform, dark red, about 13 mm. diameter.

VII. Silvicolae

Anthers red, rose, pink or purple. Stamens 10 or less

A. Leaves of flowering branches mostly narrowed at base (on vigorous shoots rounded or truncate)

acerba Sarg. Fruit obovoid, crimson, pale dotted, 8–10 mm. diameter.

aemula Beadle. Fruit globose or subglobose, red, 10–13 mm. diameter.

ambigens Sarg. Fruit globose or depressed-globose, greenish-yellow, becoming dark purplish-red, pale dotted, 10–12 mm. diameter. Terminal shoot leaves sometimes subcordate.

Barryana Sarg. Fruit obovoid, crimson, pale dotted, about 15 mm. diameter. Terminal shoot leaves sometimes subcordate.

blairensis Sarg. Fruit subglobose to slightly obovoid, dull red, pale dotted, 10–12 mm. diameter.

coerulea Sarg. Fruit obovoid, bright orange-red, pale dotted, 10–12 mm. diameter.

compta Sarg. Fruit oblong-obovoid, rarely oblong, light cherry-red, pale dotted, about 12 mm. diameter. Terminal shoot leaves sometimes subcordate.

congestiflora Sarg. Fruit obovoid, crimson, pale dotted, 9–11 mm. diameter.

cruda Sarg. Fruit obovoid, scarlet, pale dotted, about 10 mm. diameter.

delectata Sarg. Fruit obovoid, crimson, pale dotted, about 10 mm. diameter.

dissociabilis Sarg. Fruit obovoid, light cherry-red, about 9 mm. diameter. Terminal shoot leaves sometimes subcordate.

dissona Sarg. Fruit depressed-globose, crimson blotched with green, pale dotted, 12–16 mm. diameter.

effera Sarg. Fruit obovoid, orange-red, pale dotted, 10–12 mm. diameter.

gravis Ashe. Fruit short-oblong, red or crimson, 8–9 mm. diameter.

impervia Sarg. Fruit short-oblong to slightly obovoid, salmon-red, 10–12 mm. diameter.

implicata Sarg. Fruit subglobose to ovoid, crimson, pale dotted, 8–11 mm. diameter.

infensa Sarg. Fruit short-obovoid, scarlet, pale dotted, 10–11 mm. diameter. Terminal shoot leaves often subcordate.

iterata Sarg. Fruit subglobose, angled, light orange-red, blotched with green, 13–15 mm. (or less) diameter.

laetans Sarg. Fruit obovoid, rarely short-oblong, dark orange-red, pale dotted, 11–13 mm. diameter.

leimonia Sarg. Fruit subglobose, angled, orange-red blotched with yellow-green, pale dotted, 10–15 mm. (or less) diameter.

Livingstoniana Sarg. Fruit short-oblong, red, pale dotted, 10–12 mm. diameter. Terminal shoot leaves sometimes subcordate.

luxuriosa Sarg. Fruit subglobose to slightly obovoid, scarlet, pale dotted, 12–18 mm. diameter.

perspicabilis Sarg. Fruit subglobose to short-oblong, maroon, pale dotted, 10–14 mm. diameter.

promissa Sarg. Fruit oblong or obovoid, crimson, 7–8 mm. diameter.

prona Ashe. Fruit oblong-obovoid or pyriform, dark red mottled with green and russet, 8–10 mm. diameter.

puta Sarg. Fruit subglobose, scarlet, pale dotted, 10–14 mm. diameter.

pyramidata Sarg. Fruit short-oblong or slightly obovoid, scarlet, pale dotted, 10–11 mm. diameter.

radina Sarg. Fruit globose or slightly obovoid, yellow-green to dark purplish-red, pale dotted, 12–14 mm. diameter.

recordabilis Sarg. Fruit narrow-obovoid, greenish-orange to scarlet, pale dotted, 9–10 mm. diameter.

ruricola Sarg. Fruit obovoid, scarlet, 10–15 mm. diameter.

sectilis Ashe. (?) Fruit subglobose or obovoid, dark red, 12–16 mm. diameter.

strigosa Sarg. Fruit short-oblong, scarlet, dark dotted, 10–11 mm. diameter.

tortuosa Sarg. Fruit obovoid, bright orange-red, pale dotted, 10–12 mm. diameter.

xanthophylla Sarg. Fruit short-oblong, orange-red, pale dotted, 10–12 mm. diameter.

AA. Leaves of flowering branches mostly broad or rounded at base (on vigorous shoots truncate to cordate)

albicans Ashe. (?) Fruit globular, dark red, 10–13 mm. diameter.

allecta Sarg. Fruit obovoid, bright orange-red, dark dotted, 8–10 mm. diameter.

ampliata Sarg. Fruit short-oblong, dull scarlet, 9–10 mm. diameter.

delicata Sarg. Fruit ovoid to oblong, dull red, 10–12 mm. diameter.

diffusa Sarg. Fruit subglobose to short-oblong, scarlet, dark dotted, 13–15 mm. diameter.

drymophila Sarg. Fruit globose, red or greenish, 10–11 mm. diameter.

filipes Ashe. Fruit obovoid, crimson or green, spotted, 10–12 mm. diameter.

Maineana Sarg. Fruit globose, dark scarlet with light spots, about 15 mm. diameter.

medioxima Sarg. Fruit subglobose, rarely short-oblong, dark red, pale dotted, 11–14 mm. diameter.

opulens Sarg. Fruit subglobose to short-obovoid, crimson, dark dotted, 13–15 mm. diameter.

riparia Ashe. (?) Color of anthers not given. Fruit globose, orange-yellow, 7–8 mm. diameter.

stolonifera Sarg. Fruit short-oblong to subglobose, scarlet, 10–11 mm. diameter.

VIII. Pruinosae

A. Anthers pink, rose or purple (AA see p. 105)

B. Stamens about 10 (7–15) (BB see p. 101)

C. Leaves of flowering branches mostly narrowed or cuneate at base (on vigorous shoots rounded to truncate), at flowering time glabrous

alacris Sarg. Fruit short-oblong or slightly obovoid, bright red, 8–10 mm. diameter.

aridula Sarg. Fruit obovoid, dark red, pale dotted, 8–9 mm. diameter.

bellula Sarg. Fruit subglobose or broadly obovoid, dull crimson, pale dotted, 15–18 mm. diameter.

brevipes Peck. Fruit subglobose to depressed-globose, dull red blotched with red, 10–15 mm. diameter.

deducta Sarg. Fruit short-oblong to ovoid, green, 10–12 mm. diameter.

disjuncta Sarg. Fruit subglobose, green tinged with red, 12–14 mm. diameter.

divisifolia Sarg. Fruit depressed-globose, angled, dull red or blotched with green or russet, 14–17 mm. diameter.

erubescens Sarg. Fruit subglobose, pentagonal, purple-red, pale dotted, 12–15 mm. diameter. Leaves sometimes broader.

franklinensis Sarg. Fruit slightly obovoid to subglobose, dark red, 8–10 mm. diameter.

incisa Sarg. Fruit obovoid, green, red tinged or crimson, 10–12 mm. diameter.

iracunda Beadle. Fruit subglobose, red or red and green, 8–10 mm. diameter.

Jesupii Sarg. Fruit obovoid to short-oblong, bright scarlet, dark dotted, about 10 mm. diameter.

levis Sarg. Fruit obovoid, dull purple, 7–8 mm. diameter.

Milleri Sarg. Fruit obovoid, green becoming red, 8–10 mm. diameter.

nemorosa Sarg. Fruit short-oblong to obovoid, crimson, dark dotted, about 10 mm. diameter.

numerosa Sarg. Fruit obovoid, scarlet, pale dotted, 9–10 mm. diameter.

ovatifolia Sarg. Fruit obovoid, scarlet, dark dotted, 8–10 mm. diameter.

placiva Sarg. Fruit short-oblong or obovoid, bright orange-red, pale dotted, 10–12 mm. diameter.

procera Sarg. Fruit subglobose, crimson, pale dotted, 10–12 mm. diameter.

pulchra Sarg. Fruit short-oblong, cherry-red, 10–12 mm. diameter.

radiata Sarg. Fruit short-oblong, crimson, dark dotted, 15–17 mm. diam.

remota Sarg. Fruit subglobose or slightly obovoid, scarlet, 10–15 mm. diameter.

rigida Sarg. Fruit subglobose, angled, green, rose tinged, 10–12 mm. diameter.

superata Sarg. Fruit subglobose, green becoming crimson, dark dotted, 12–15 mm. diameter.

uncta Sarg. Fruit short-oblong, red, pale dotted, 10–12 mm. diameter.

CC. Leaves of flowering branches broader, mostly rounded, truncate or cordate at base

D. Leaves at flowering time glabrous or nearly so

erubescens Sarg. Fruit subglobose, pentagonal, purple-red, pale dotted, 12–15 mm. diameter.

deltoides Ashe. Fruit globular or depressed-globular, dark red, 15–17 mm. diameter.

depressa Ashe. (?) Color of anthers unknown. Fruit depressed-globose, dark red, 12–14 mm. diameter.

macera Sarg. Fruit subglobose to short-oblong, scarlet, dark dotted, about 10 mm. diameter.

plana Sarg. Fruit short-oblong, pale green becoming crimson, pale dotted, 10–12 mm. diameter.

relicta Sarg. Fruit subglobose, green flushed with red, 9–10 mm. diameter.

DD. Leaves at flowering time pubescent or scabrate above

exornata Sarg. Fruit subglobose, scarlet, dark dotted, 10–12 mm. diameter.

BB. Stamens about 20 (15–20)

C. Leaves of flowering branches mostly narrowed or cuneate at base (on vigorous shoots rounded to truncate, rarely subcordate) (CC see p. 104)

D. Leaves at flowering time glabrous or nearly so

advena Sarg. Fruit subglobose to slightly obovoid, green becoming reddish, about 15 mm. diameter. Leaves sometimes slightly villous.

ambitiosa Sarg. Fruit obovoid, crimson, green blotched, with dark dots, 10–12 mm. diameter. Leaves sometimes slightly villous.

amoena Sarg. Fruit subglobose to short-oblong, dark red, 10–12 mm. diameter.

aristata Sarg. Fruit subglobose, bright red, 10–12 mm. diameter.

ater Ashe. Fruit oblong to obovoid, dark dull red mottled with green or olive, 10–12 mm. diameter.

austera Sarg. Fruit subglobose, dull green or reddish, 10–12 mm. diameter.

bellatula Sarg. Fruit short-oblong, green turning red, about 10 mm. diameter.

bona Sarg. Fruit depressed-globose, angular, dark olive-green or spotted with russet and orange, 12–14 mm. diameter.

bronxensis Sarg. Fruit subglobose, apple-green, dark dotted, 10–12 mm. diameter. Leaves sometimes villous or scabrous.

casta Sarg. Fruit obovoid, bright cherry-red, pale dotted, 8–10 mm. diameter.

Clintoniana Sarg. Fruit subglobose, angled, orange-red, pale dotted, 12–14 mm. diameter. Leaves sometimes slightly villous.

comata Sarg. Fruit depressed-globose, bright green becoming light cherry-red, about 16 mm. diameter. Leaves sometimes slightly villous above.

Crawfordiana Sarg. Fruit oval to pyriform-oval, dark orange-red blotched with yellow-green, pale dotted, 10–12 mm. diameter.

denudata Sarg. Fruit subglobose to ovoid-globose, russet-green to dark purplish red, 10–13 mm. diameter.

festiva Sarg. Fruit subglobose, dull red, 10–11 mm. diameter.

fusca Sarg. Fruit short-oblong, dull brown, 10–12 mm. diameter.

gaudens Sarg. Fruit pyriform, angled, deep orange-red, pale dotted, 11–14 mm. diameter.

georgiana Sarg. Fruit short-oblong, dull russet-green, 10–13 mm. diameter.

gracilis Sarg. Fruit depressed-globose, green tinged with red or orange, about 10 mm. diameter.

horridula Sarg. Fruit obovoid, green becoming dull red, dark dotted, about 10 mm. diameter.

Howeana Sarg. Fruit globose to depressed-globose, reddish-green to bright scarlet, 13–15 mm. (or often less) in diameter.

immanis Ashe. Fruit "discoid," (or subglobose) bright green, crimson spotted, 13–16 mm. diameter.

Kellermanii Sarg. Fruit subglobose, red tinged with green, 14–18 mm. (or less) diameter.

latiflora Sarg. Fruit short-oblong, vermilion, pale dotted, 8–9 mm. diameter.

obstipa Sarg. Fruit obconic, crimson, pale dotted, 10–12 mm. diameter.

pallescens Sarg. Fruit short-oblong, cardinal-red, pale dotted, 10–12 mm. diameter.

parvula Sarg. Fruit ovoid to slightly obovoid, crimson, pale dotted, 10–12 mm. diameter.

pellecta Sarg. Fruit short-oblong to subglobose, dark red, 12–14 mm. diameter.

pequotorum Sarg. Fruit short-obovoid, dark crimson with dark lenticles, 11–13 mm. diameter.

pilosa Sarg. Fruit subglobose to broadly ovoid, dull dark crimson, 8–10 mm. diameter. Leaves sometimes slightly villous.

quinebaugensis Sarg. Fruit oblong or slightly obovoid, light red or purplish, 8–9 mm. diameter.

Ruthiana Sarg. Fruit depressed-globose or short-oblong, bright apple-green, turning red, about 10 mm. diameter. Leaves sometimes slightly villous.

scitula Sarg. Fruit subglobose, crimson, pale dotted, 9–11 mm. diameter.

sitiens Ashe. Fruit obovoid, green mottled with russet, 12–14 mm. (or less) diameter.

torta Sarg. Fruit short-oblong, angled, light yellow or russet-green, dark dotted, 8–11 mm. diameter.

tumida Sarg. Fruit subglobose, dull crimson, 14–15 mm. diameter.

viatica Ashe. Fruit globose, dull green mottled with pink and russet, about 15 mm. (or less) diameter.

virella Ashe. Fruit depressed-globose, yellowish-green blotched with pink, olive or russet, about 13 mm. diameter. Leaves sometimes slightly pubescent.

Wilmorensis Sarg. Fruit subglobose to short-oblong, green becoming reddish, 10–12 mm. diameter.

DD. Leaves at flowering time scabrous or pubescent

advena Sarg. Leaves sometimes glabrous. Fruit characters as given above.

ambitiosa Sarg. Leaves sometimes nearly or quite glabrous. Fruit characters as given above.

bronxensis Sarg. Leaves sometimes nearly glabrous. Fruit characters as given above.

Clintoniana Sarg. Leaves sometimes glabrous or nearly so. Fruit characters as given above.

comata Sarg. Leaves sometimes nearly or quite glabrous. Fruit characters as given above.

decorata Sarg. Fruit depressed-globose or short-oblong, angled, dark red, dark dotted, 8–10 mm. diameter.

pelacris Sarg. Fruit subglobose to obovoid, green becoming red, 10–12 mm. diameter.

pilosa Sarg. Young leaves sometimes nearly or quite glabrous. Fruit characters as given above.

platycarpa Sarg. Fruit short-oblong, angled, dull red, dark dotted, 10–12 mm. diameter. Leaves sometimes nearly glabrous.

Ruthiana Sarg. Leaves sometimes nearly or quite glabrous. Fruit characters as given above.

virella Ashe. Leaves sometimes glabrous. Fruit characters as given above.

CC. Leaves of flowering branches broader, mostly rounded, truncate or cordate at base

D. Leaves at flowering time glabrous or nearly so

amplifica Sarg. Fruit depressed-globose, light greenish-yellow to dark russet, 10–12 mm. diameter.

angulata Sarg. Fruit depressed-ovoid, pentagonal, light greenish-yellow becoming dark purplish-red, dark dotted, 15–16 mm. diameter.

arcana Beadle. Fruit subglobose, obtusely angled, red or ruddy, 12–15 mm. diameter.

beata Sarg. Fruit oblong to oblong-obovoid, crimson, pale dotted, 9–10 mm. diameter.

bracteata Sarg. Fruit subglobose, crimson, pale dotted, 12–14 mm. diameter.

calliantha Sarg. Fruit short-oblong, angled, pink, about 10 mm. diameter.

comparata Sarg. Fruit obovoid to oval, crimson, 9–10 mm. diameter.

confragosa Sarg. Fruit short-oblong to obovoid, scarlet, dark dotted, about 10 mm. (or more) diameter.

dunmorensis Sarg. Fruit obovoid, green becoming dull red, 10–12 mm. (or more) diameter.

Gattingeri Ashe. Fruit globular, dark red, 8–11 mm. diameter.

leiophylla Sarg. Fruit obovoid, dark green becoming bright red, 12–14 mm. diameter. (Anthers described as pale yellow, but apparently through error.)

Lennoniana Sarg. Fruit ovoid to oblong, dark crimson, pale dotted, 8–10 mm. diameter.

Mackenzii Sarg. (?) Fruit subglobose to short-oblong, green becoming lurid red, 10–12 mm. diameter. Color of anthers unknown.

macrocalyx Sarg. Fruit short-oblong, slightly angled, red, pale dotted, 10–12 mm. diameter.

oblita Sarg. Fruit obovoid, crimson, pale dotted, 9–10 mm. diameter.

perampla Sarg. Fruit short-oblong, dull red, 10–12 mm. diameter.

philadelphica Sarg. Fruit depressed-globose, green, dark dotted, 10–15 mm. diameter.

prominens Sarg. Fruit broad-obovoid or short-oblong, green with purplish cheek, 12–14 mm. diameter.

pruinosa K. Koch. Fruit subglobose, green becoming red, 10–12 mm. diameter.

ramosa Sarg. Fruit short-oblong to oval, red, punctate, 10–11 mm. diameter.

rubicundula Sarg. Fruit subglobose or depressed-globose, green becoming red tinged, pale dotted, 13–14 mm. diameter.

seclusa Sarg. Fruit subglobose, angled, light orange-red blotched with green, 13–15 mm. (or less) diameter.

seducta Sarg. Fruit depressed-globose, green blotched with red, 10–11 mm. diameter.

DD. Leaves at flowering time villous beneath

aspera Sarg. Fruit short-oblong to subglobose, scarlet, 10–12 mm. diameter.

AA. Anthers white, cream or yellow

B. Stamens about 10

C. Leaves of flowering branches mostly cuneate or narrowed at base (on vigorous shoots rounded to truncate, rarely subcordate)

D. Leaves at flowering time glabrous

brachypoda Sarg. Fruit subglobose, green, red tinged, becoming dull red, 10–12 mm. diameter.

delawarensis Sarg. Fruit subglobose, dark red, 11–12 mm. diameter.

rara Sarg. Fruit depressed-globose, dull dark red, 12–14 mm. diameter.

DD. Leaves at flowering time scabrous or pubescent

inusitula Sarg. Fruit short-oblong, dull greenish-red, pale dotted, about 10 mm. diameter. Leaves scabrate above.

sicca Sarg. Fruit subglobose to short-oblong, becoming light orange-yellow, pale dotted, about 10 mm. diameter. Leaves more or less villous above.

C. Leaves of flowering branches broader, mostly rounded to truncate at base (on vigorous shoots cordate), at flowering time glabrous

depressa Ashe. (?) Color of anthers unknown. Fruit characters as given above.

BB. Stamens about 20 (15–20)

C. Leaves of fruiting branches mostly cuneate or narrowed at base (on vigorous shoots rounded or truncate, rarely subcordate)

D. Leaves at flowering time glabrous

ambitiosa Sarg. Fruit obovoid, crimson blotched with green, pale dotted, 10–12 mm. (or more) diameter. Anthers described as yellow faintly tinged with pink in bud.

aperta Sarg. Fruit subglobose, dull green, red tinged, about 10 mm. diameter.

bedfordensis Sarg. Fruit short-oblong to slightly obovoid, green turning pale red, dark dotted, 8–10 mm. diameter.

caerulescens Sarg. Fruit obovoid, dull red, 7–8 mm. diameter.

callida Beadle. Fruit depressed-globose, green and red or russet and red, 8–10 mm. diameter.

callosa Sarg. Fruit globose or depressed-globose, green becoming dark red or cardinal, blotched and punctate with dark olive-green or russet, 13–16 mm. diameter.

cestrica Sarg. Fruit subglobose to obovoid, dark crimson, dark dotted, 12–15 mm. diameter.

cognata Sarg. Fruit pyriform or oblong (or depressed-globose), 12–14 mm. diameter.

conjuncta Sarg. Fruit subglobose or depressed-globose, dull orange-red blotched with green, dark dotted, about 10 mm. diameter.

duracina Sarg. Fruit subglobose to slightly obovoid, red blotched with green, 8–10 mm. diameter.

Ferrissii Ashe. Fruit oblong or pyriform, crimson, 8–13 mm. diameter.

formosa Sarg. Fruit oblong to slightly obovoid, scarlet with pale lenticles, about 10 mm. diameter.

glareosa Ashe. Fruit globose, bright scarlet, about 15 mm. diameter. Leaves sometimes slightly villous beneath.

insueta Sarg. Fruit pyriform, dull green tinged with red, 9–10 mm. diameter.

latifrons Sarg. Fruit subglobose to short-oblong, dark red, green blotched, 14–15 mm. diameter.

latisepala Ashe. Fruit obovoid, dull green becoming crimson, dark dotted, 9–12 mm. diameter.

littoralis Sarg. Fruit obovoid, dark crimson, 10–11 mm. diameter.

longipedunculata Sarg. Fruit obovoid, dark green, red tinged, dark dotted, 8–10 mm. diameter.

magnifolia Sarg. Fruit subglobose, angled, dull red with dark blotches, about 15 mm. (or less) diameter.

onusta Ashe. Fruit globose, dark red, 14–16 mm. (or less) diameter.

perjucunda Sarg. Fruit short-oblong to ovoid, orange-red becoming crimson, dark dotted, 10–12 mm. diameter.

Porteri Britton. Fruit pyriform or short-oblong, crimson, dark dotted, 9–10 mm. diameter.

rubro-lutea Sarg. Fruit subglobose or obovoid, light orange-red, dark dotted, 12–15 mm. diameter.

russata Sarg. Fruit obovoid, pale red, about 10 mm. diameter.

rustica Beadle. Fruit subglobose, obtusely angled and swelled below middle, red and green, becoming dull red, 7–11 mm. diameter.

Shaferi Ashe. Fruit subglobose, dark red or green mottled, 14–16 mm. (or less) diameter.

tribulosa Sarg. Fruit short-oblong to subglobose, dull green, red tinged, about 10 mm. diameter.

uplandia Sarg. Fruit subglobose to short-oblong or slightly obovoid, dark deep red, pale dotted, 14–15 mm. diameter.

vicinalis Beadle. Fruit pyriform, red or ruddy, 9–12 mm. diameter.

DD. Leaves at flowering time more or less villous or pubescent

ellipticifolia Sarg. Fruit short-oblong to subglobose, dull red, about 10 mm. diameter.

ingrata Ashe. Fruit subglobose, dull red, 12–14 mm. diameter.

lecta Sarg. Fruit obovoid, light yellow-green, becoming red, 13–15 mm. diameter.

locuples Sarg. Fruit subglobose, dull green, red tinged, 12–14 mm. diameter.

CC. Leaves of flowering branches broader, mostly rounded or truncate (on vigorous shoots cordate); glabrous at flowering time

augusta Sarg. Fruit pyriform or at maturity globose or depressed-globose, angled, red or crimson or blotched with olive-green, 10–14 mm. diameter.

incompta Sarg. Fruit subglobose or depressed-globose, dull red, pale dotted, about 10 mm. diameter.

jejuna Sarg. Fruit short-oblong to ovoid, angled, dull green, 7–8 mm. diameter.

Mackenzii Sarg. (?) Color of anthers unknown. Fruit characters as given above.

patrum Sarg. Fruit short-oblong to slightly obovoid, dull green, dark dotted, 8–10 mm. diameter.

IX. Coccineae

A. Anthers red, pink, rose or purple (AA see p. 109)
B. Stamens about 10 (5–10)
D. Corymbs at flowering time glabrous or nearly so

cristata Ashe. Fruit globose or pyriform, scarlet or darker, 15–20 mm. diameter. Corymbs sometimes slightly villous.

delecta Sarg. Fruit subglobose to slightly obovoid, scarlet becoming purple, 18–20 mm. diameter. Corymbs sometimes slightly villous.

fretalis Sarg. Fruit oblong to obovoid, crimson, about 10 mm. diameter.

Holmesiana Ashe. Fruit obovoid to ellipsoid, crimson, dark dotted, 8–11 mm. diameter. Corymbs villous in varieties.

Letchworthiana Sarg. Fruit obovoid, scarlet, pale dotted, 10–11 mm. diameter.

neofaxonii Sarg. Fruit obovate, bright cherry-red, pale dotted, 10–12 mm. diameter.

pedicellata Sarg. Fruit oblong, bright scarlet with dark lenticles, 12–18 mm. diameter.

polita Sarg. Fruit subglobose to short-oblong, rarely broadly obovoid, bright cherry-red blotched with green or yellow, dark dotted, 9–11 mm. diameter.

Thayeri Sarg. Fruit subglobose to short-oblong or obovoid, orange-red with pale lenticles, 8–10 mm. diameter.

DD. Corymbs at flowering time villous or pubescent

acclivis Sarg. Fruit short-oblong, yellowish-red, pale dotted, about 12 mm. (or more) diameter.

arcuata Ashe. Fruit oblong-globular, scarlet or mottled with orange and russet, 11–13 mm. diameter.

assurgens Sarg. Fruit oblong or slightly obovoid, dull red or crimson, 10–15 mm. diameter. Stamens sometimes 20.

aulica Sarg. Fruit short-oblong or slightly obovoid, orange-red with pale lenticles, about 15 mm. diameter.

Burkeana Sarg. Fruit subglobose to short-oblong or slightly obovoid, crimson, pale dotted, 10–12 mm. diameter.

caesa Ashe. Fruit subglobose or oblong, bright scarlet, 12 mm. diameter.

confinis Sarg. Fruit short-oblong, scarlet, pale dotted, 8–9 mm. diameter.

cristata Ashe. Corymbs usually glabrous. Fruit characters as given above.

delecta Sarg. Corymbs sometimes glabrous. Fruit characters as given above.

Eamesii Sarg. Fruit short-oblong to slightly ovoid, bright cherry-red, dark dotted, 18–20 mm. diameter.

elongata Sarg. Fruit oblong-obovoid, crimson, pale dotted, about 8 mm. diameter.

fluviatilis Sarg. Fruit oblong, rarely obovoid, crimson, 8–10 mm. diameter.

Holmesiana var. tardipes Sarg. Fruit as in species.

lenta Ashe. Fruit pyriform, scarlet, 10–14 mm. diameter.

lobulata Sarg. Fruit oblong, bright crimson with pale lenticles, about 10 mm. diameter.

Pringlei Sarg. Fruit oblong, dark dull red with pale lenticles, 15–16 mm. diameter.

pura Sarg. Fruit oval to slightly obovoid, bright orange-red, dark dotted, 8–10 mm. diameter.

sejuncta Sarg. Fruit subglobose to oval, crimson, pale dotted, 13–15 mm. (or less) diameter.

sertata Sarg. Fruit subglobose to slightly obovoid, bright red becoming crimson, pale dotted, 10–14 mm. diameter.

uticaensis Sarg. Fruit short-oblong, scarlet, pale dotted, 12–13 mm. diameter.

vivida Sarg. Fruit obovoid, dull orange-red blotched with yellow, 9–10 mm. diameter.

BB. Stamens about 20 (15–20)

D. Corymbs at flowering time glabrous or nearly so

contigua Sarg. Fruit oblong to obovoid, scarlet, pale dotted, 8–10 mm. diameter.

limosa Sarg. Fruit short-oblong, crimson, pale dotted, 8–10 mm. diameter. Corymbs often slightly villous.

magniflora Sarg. Fruit short-obovoid, scarlet, pale dotted, about 14 mm. diameter.

miranda Sarg. Fruit obovoid, scarlet, pale dotted, about 10 mm. diameter.

illicebrosa Sarg. Fruit obovoid, crimson, pale dotted, 12–13 mm. diameter.

Putnamiana Sarg. Fruit depressed-globose, green turning red, punctate, about 15 mm. diameter.

splendida Sarg. Fruit short-oblong to obovoid, crimson, pale dotted, 9–10 mm. diameter.

DD. Corymbs at flowering time villous or pubescent

assurgens Sarg. Stamens sometimes 10. Fruit characters as given above.

chippewaensis Sarg. Fruit oblong-obovoid, crimson, dark dotted, 10–16 mm. diameter.

Dayana Sarg. Fruit obovoid, crimson, pale dotted, 15–18 mm. diameter.

Gilbertiana Sarg. Fruit obovoid, crimson, pale dotted, 13–15 mm. diameter.

Hillii Sarg. Fruit obovoid, crimson, pale dotted, 10–12 mm. diameter.

limosa Sarg. Corymbs sometimes glabrous or nearly so. Fruit characters as given above.

Macounii Sarg. Fruit oblong-obovoid, scarlet mottled with green, 10–12 mm. diameter.

neolondinensis Sarg. Fruit obovoid to short-oblong, bright red, pale dotted, 13–18 mm. diameter.

steubenensis Sarg. Fruit obovoid, scarlet, pale dotted, 9–10 mm. diameter.

AA. Anthers white, cream or yellow

B. Stamens about 10 (5–10). Corymbs at flowering time villous or pubescent

perrara Sarg. Fruit short-oblong to slightly obovoid, crimson, pale dotted, 10–12 mm. diameter.

BB. Stamens about 20. Corymbs at flowering time villous or pubescent

conspecta Sarg. Fruit subglobose to short-oblong, crimson, pale dotted, about 18 mm. diameter.

irrasa Sarg. Fruit oblong, dark red, pale dotted, about 10 mm. diameter.

X. Molles

A. Anthers red, pink or rose

B. Stamens about 10

C. Leaves of flowering branches mostly cuneate or rounded at base (on vigorous shoots truncate or subcordate)

anomala Sarg. Fruit obovoid to oblong, crimson with pale lenticles, 15–20 mm. diameter.

digna Sarg. Fruit globose to slightly oblong, scarlet dotted with yellow or orange, 12–14 mm. diameter.

Greggiana Egglest. Fruit globose, brick-red, 10–12 mm. diameter.

noelensis Sarg. Fruit subglobose, orange-red, about 10 mm. diameter.

Tracyi Ashe. Fruit scarlet, subglobose, 10–15 mm. diameter.

urbica Sarg. Fruit pyriform, becoming subglobose to short-oblong, crimson, pale dotted, 10–15 mm. diameter.

CC. Leaves of flowering branches broader, mostly rounded, truncate or cordate at base (on vigorous shoots cordate)

Ellwangeriana Sarg. Fruit short-oblong, crimson, 15–20 mm. diameter.

exclusa Sarg. Fruit oblong, rarely ovoid, bright cherry-red, dark dotted, about 13 mm. diameter.

Huntiana Sarg. Fruit obovoid, scarlet, dark dotted, 16–18 mm. diameter.

lauta Sarg. Fruit oblong or short-oblong, bright orange-red, dark dotted, 15–18 mm. diameter.

pennsylvanica Ashe. Fruit globular or oblong, dull red mottled with green, russet and scarlet, 15–20 mm. diameter.

Robesoniana Sarg. Fruit oblong, bright scarlet, pale dotted, 10–15 mm. diameter.

BB. Stamens about 20

C. Leaves of flowering branches mostly cuneate or rounded at base (on vigorous shoots truncate or subcordate)

amabilis Ashe. Fruit globose, bright scarlet or red, about 20 mm. diameter. Color of anthers unknown.

dispessa Ashe. Fruit pyriform or obovoid, bright cherry-red, 10–15 mm. diameter.

gravida Beadle. Fruit depressed-globose, red, 12–15 mm. diameter. Leaves sometimes broader, subcordate on shoots.

induta Sarg. Fruit short-oblong, crimson or reddish-yellow, pale dotted, 18–20 mm. diameter.

lanuginosa Sarg. Fruit subglobose to short-oblong, dark crimson, pale dotted, 10–12 mm. (or larger) diameter. Leaves sometimes broader, subcordate on shoots.

Kelloggii Sarg. Fruit subglobose to short-oval, bright yellow with pale lenticles, about 20 mm. diameter.

quercina Ashe. Fruit subglobose, dark red, pale dotted, 10–15 mm. diameter.

radians Sarg. Fruit short-oblong or obovoid, crimson, pale dotted, 16–18 mm. diameter.

texana Buckley. Fruit obovoid to short-oblong, bright scarlet, 12–18 mm. diameter.

CC. Leaves of flowering branches broader, rounded to subcordate at base (on vigorous shoots cordate)

brachyphylla Sarg. Fruit subglobose, dull dark red, 10–14 mm. diameter.

corusca Sarg. Fruit short-oblong to obovoid, dark cherry-red, pale dotted, 12–15 mm. diameter.

dasyphylla Sarg. Fruit short-oblong, crimson, pale dotted, 18–20 mm. diameter.

Fulleriana Sarg. Fruit short-oblong, scarlet, pale dotted, about 12 mm. diameter.

gravida Beadle. Leaves sometimes narrowed at base. Fruit characters as given above.

lanuginosa Sarg. Leaves sometimes narrowed at base. Fruit characters as given above.

nupera Ashe. (?) Fruit globular or slightly oblong, dark red, 13–15 mm. diameter. Color of anthers unknown.

placens Sarg. Fruit obovoid, scarlet, 10–12 mm. diameter.

valens Ashe. (?) Fruit subglobose, bright red, 16–20 mm. diameter. Color of anthers unknown.

venosa Ashe. (?) Fruit globose or subglobose, bright red, 15–18 mm. diameter. Color of anthers unknown.

verna Ashe. (?) Fruit subglobose, dark red, 16–18 mm. diameter. Color of anthers unknown.

vesca Ashe. (?) Fruit subglobose, scarlet, 18–24 mm. diameter. Color of anthers unknown.

AA. Anthers white, cream or yellow

B. Stamens about 10

C. Leaves of flowering branches mostly narrowed or rounded at base (on vigorous shoots truncate to subcordate)

Arnoldiana Sarg. Fruit subglobose, bright crimson with pale lenticles, 15–20 mm. diameter.

champlainensis Sarg. Fruit obovoid to oblong, bright scarlet with pale lenticles, 15–20 mm. diameter. Leaves sometimes broader.

submollis Sarg. Fruit obovoid, bright orange-red, 15–20 mm. diameter.

Tracyi Ashe. Fruit subglobose, deep scarlet, 8–12 mm. diameter.

uvaldensis Sarg. Fruit subglobose to short-oblong, orange-red, 12–14 mm. diameter.

CC. Leaves of flowering branches broader, mostly rounded to subcordate at base (on vigorous shoots cordate)

champlainensis Sarg. Leaves often narrowed at base. Fruit characters as given above.

contortifolia Sarg. Fruit subglobose to short-oblong, bright cherry-red, about 15 mm. diameter.

Tatnalliana Sarg. Fruit globose, obovoid or rarely oblong, bright orange-red, pale dotted, 10–12 mm. diameter.

BB. Stamens about 20

C. Leaves of flowering branches mostly narrowed or rounded at base (on vigorous shoots truncate or subcordate)

amabilis Ashe. (?) Color of anthers unknown. Fruit characters as given above.

arkansana Sarg. Fruit oblong or rarely obovoid, bright crimson with dark lenticels, 13–18 mm. diameter.

Berlandieri Sarg. Fruit short-oblong to subglobose, scarlet, 10–16 mm. diameter.

canadensis Sarg. Fruit short-oblong to subglobose, crimson with pale lenticles, 10–15 mm. diameter.

cibaria Beadle. Fruit short-oblong to obovoid, red, 12–15 mm. diameter.

dumetosa Sarg. Fruit obovoid, scarlet, dark dotted, 10–15 mm. diameter.

invisa Sarg. Fruit short-oblong, orange-red, pale dotted, 10–12 mm. diameter.

limaria Sarg. Fruit oval to ovoid or short-oblong, crimson, pale dotted, 12–14 mm. diameter. Leaves sometimes broad-based.

meridionalis Sarg. Fruit short-oblong to subglobose, scarlet, 10–12 mm. diameter.

mollipes Sarg. Fruit obovoid, scarlet, pale dotted, 8–9 mm. diameter. Leaves sometimes broader-based.

obtecta Ashe. Fruit pyriform, dark red, 12–15 mm. diameter.

Ridgwayi Sarg. Fruit subglobose or short-oblong, scarlet, 10–12 mm. diameter.

sera Sarg. Fruit obovoid or short-oblong, dull dark red, pale dotted, 12–20 mm. diameter.

Treleasei Sarg. Fruit subglobose, crimson, pale dotted, 12–17 mm. diameter.

umbrosa Sarg. Fruit obovoid to subglobose, scarlet, pale dotted, about 10 mm. diameter.

viburnifolia Sarg. Fruit subglobose, bright canary-yellow, 15–20 mm. diameter.

CC. Leaves of flowering branches broader, mostly rounded to subcordate at base (on vigorous shoots cordate)

altrix Ashe. Fruit globose, bright red, 13–18 mm. diameter.

cibilis Ashe. Fruit depressed-globose, dark red, 12–15 mm. diameter.

declivitatis Sarg. Fruit subglobose to short-oblong, dull red, 12–13 mm. diameter.

lanigera Sarg. Fruit obovoid, crimson, 10–11 mm. diameter.

lasiantha Sarg. Fruit oval or subglobose, crimson, pale dotted, about 12 mm. diameter.

limaria Sarg. Leaves sometimes narrowed at base. Fruit characters as given above.

macrophylla Sarg. Fruit oval, crimson, pale dotted, 15–16 mm. (or more) diameter.

mollipes Sarg. Leaves sometimes narrowed at base. Fruit characters as given above.

mollis Scheele. Fruit short-oblong to subglobose, scarlet, dark dotted, 20–25 mm. diameter.

nupera Ashe. (?) Color of anthers unknown. Fruit characters as given above.

nutans Sarg. Fruit short-oblong to subglobose or slightly obovoid, orange-red with dark lenticles, 10–12 mm. diameter.

redolens Ashe. Fruit globose, dark red, 15–20 mm. diameter.

valens Ashe. (?) Color of anthers unknown. Fruit characters as given above.

venosa Ashe. (?) Color of anthers unknown. Fruit characters as given above.

verna Ashe. (?) Color of anthers unknown. Fruit characters as given above.

vesca Ashe. (?) Color of anthers unknown. Fruit characters as given above.

XI. Dilatatae

Anthers pink, rose or purple. Stamens about 20

A. Leaves of flowering branches mostly narrowed at base, glabrous or nearly so

durobrivensis Sarg. Fruit globose, crimson, pale dotted, about 16 mm. diameter.

hudsonica Sarg. Fruit subglobose, crimson, 16–18 mm. diameter.

suborbiculata Sarg. Fruit subglobose, dull red blotched with green, 12–15 mm. diameter.

AA. Leaves of flowering branches mostly truncate to cordate

B. Leaves at flowering time glabrous or nearly so; corymbs glabrous

coccinioides Ashe. Fruit subglobose, dark crimson, pale dotted, 15–20 mm. diameter.

BB. Leaves at flowering time short villous above; corymbs more or less villous

dilatata Sarg. Fruit subglobose, bright scarlet, 18–20 mm. diameter.

XII. Rotundifoliae

A. Anthers pink, rose or purple (AA see p. 114)

B. Stamens about 10 (5–10)

C. Corymbs at flowering time glabrous or nearly so

Bicknellii Egglest. Fruit globose, red, 10–12 mm. diameter.

cernua Ashe. Fruit oblong, crimson, 13–14 mm. diameter.

chateaugayensis Sarg. Fruit short-oblong to oval, scarlet, pale dotted, 8–10 mm. diameter.

dacrioidea Sarg. Fruit obovoid, orange-red, pale dotted, 10–12 mm. diameter.

Harryi Sarg. Fruit short-oblong to slightly obovoid, cherry-red, pale dotted, 8–9 mm. diameter.

propria Sarg. Fruit oblong or slightly ovoid, scarlet, pale dotted, 7–8 mm. diameter.

spissa Sarg. Fruit subglobose to oval, scarlet, pale dotted, 7–9 mm. diameter.

Williamsii Egglest. (?) Fruit globose, red, 8–10 mm. diameter. Color of anthers unknown.

CC. Corymbs at flowering time villous or pubescent

Fernaldii Sarg. Fruit obovoid, bright scarlet, 9–10 mm. diameter.

illuminata Sarg. (?) Fruit oval to subglobose, bright cherry-red, 7–8 mm. diameter. Color of anthers unknown.

Jonesae Sarg. Fruit oblong to oblong-obovoid, dark carmine red, punctate, 12–15 mm. diameter.

Kennedyi Sarg. Fruit slender-obovoid, crimson, 7–8 mm. diameter.

lemingtonensis Sarg. Fruit short-oblong, scarlet, pale dotted, 8–9 mm. diameter.

maligna Sarg. Fruit short-oblong, crimson, pale dotted, 9–10 mm. diameter.

praecoqua Sarg. Fruit subglobose, dark crimson, 10–15 mm. diameter.

Proctoriana Sarg. Fruit subglobose, crimson, pale dotted, 10–12 mm. diameter.

puberis Sarg. Fruit short-oblong, orange-red, pale dotted, 9–10 mm. diameter.

verrucalis Peck. Fruit subglobose to short-oblong, scarlet, 8–10 mm. diameter.

Websteri Sarg. Fruit short-oblong, bright cherry-red, pale dotted, 8–10 mm. diameter.

BB. Stamens about 20 (15–20)

C. Corymbs at flowering time glabrous or nearly so

Brainerdii Sarg. Fruit oblong, bright scarlet, 8–10 mm. diameter.

kingstonensis Sarg. Fruit subglobose, dark red, about 15 mm. diameter.

meiophylla Sarg. Fruit subglobose, dark red, about 10 mm. diameter. Corymbs sometimes slightly villous.

neobaxteri Sarg. Fruit short-oblong, rich deep red, pale dotted, 10–12 mm. diameter.

neosmithii Sarg. Fruit subglobose, light green becoming russet, 16–17 mm. diameter.

scopulorum Sarg. Fruit short-oblong to slightly obovoid, orange-red, pale dotted, 8–10 mm. diameter.

CC. Corymbs at flowering time villous or pubescent

Blanchardii Sarg. Fruit short-oblong, dark cherry-red, 10–12 mm. diameter.

Evansiana Sarg. Fruit subglobose to short-oblong, scarlet, 10–13 mm. diameter.

insolens Sarg. Fruit short-oblong, scarlet, 8–10 mm. diameter.

mansfieldensis Sarg. Fruit broad-obovoid or subglobose, dark red, 8–10 mm. diameter.

meiophylla Sarg. Corymbs sometimes nearly or quite glabrous. Fruit characters as given above.

AA. Anthers white, cream or yellow

B. Stamens about 10 (5–10)

C. Corymbs at flowering time glabrous or nearly so

Dodgei Ashe. Fruit depressed-globose, dull crimson or orange, 10–15 mm. diameter.

crassifolia Sarg. Fruit short-oblong, orange-red, pale dotted, 10–11 mm. diameter.

grossa Sarg. Fruit subglobose to short-oblong, dull orange-red, 8–10 mm. diameter.

illuminata Sarg. (?) Color of anthers unknown. Fruit characters as given above.

mercerensis Sarg. Fruit short-oblong, orange-red, 10–12 mm. diameter.

repentina Sarg. Fruit subglobose to slightly obovoid, red, 12–13 mm. diameter. Stamens sometimes 20.

rotundata Sarg. Fruit short-oblong, orange-red blotched with red and with pale lenticles, 15–20 mm. diameter.

rotundifolia Moench. Fruit subglobose, dark crimson, dark dotted, 8–10 mm. diameter. Corymbs villous in variety.

varians Sarg. Fruit subglobose, dark red blotched with green, pale dotted, 10–12 mm. diameter. Stamens 10–15.

Williamsii Egglest. (?) Color of anthers unknown. Fruit characters as given above.

CC. Corymbs at flowering time villous or pubescent

Brunetiana Sarg. Fruit oblong, bright clear red, pale dotted, 9–10 mm. diameter.

caesariata Sarg. Fruit oval or slightly obovoid, dark crimson, dark dotted, 7–12 mm. diameter.

coccinata Sarg. Fruit short-oblong to slightly obovoid, very dark crimson, pale dotted, 11–12 mm. diameter.

divergens Sarg. Fruit short-oblong to subglobose, scarlet, pale dotted, 4–5 mm. (or more) diameter. Stamens sometimes 18–20.

Faxonii Sarg. Fruit oblong, dark crimson with pale lenticles, 8–10 mm. diameter.

Jackii Sarg. Fruit ovoid to oblong, angled, dull dark red, pale dotted, 10–12 mm. diameter.

Keepii Sarg. Fruit oblong, bright clear red, white dotted, 9–10 mm. diameter.

praetermissa Sarg. Fruit short-oblong to ovoid, crimson, pale dotted, 8–9 mm. diameter.

subrotundifolia Sarg. Fruit short-oblong, crimson, pale dotted, 10–15 mm. diameter.

BB. Stamens about 20 (15–20)

C. Corymbs at flowering time glabrous or nearly so

inaudita Sarg. Fruit subglobose to short-oblong, crimson, pale dotted, 12–14 mm. diameter.

Macauleyae Sarg. Fruit subglobose to short-oblong, dark crimson, pale dotted, 10–12 mm. diameter.

Margaretta Ashe. Fruit subglobose, reddish or orange, about 10 mm. diameter. Corymbs sometimes slightly villous.

Maribella Sarg. Fruit short-oblong, crimson, pale dotted, 9–10 mm. diameter.

repentina Sarg. Stamens sometimes only 10. Fruit characters as given above.

varians Sarg. Stamens usually about 10. Fruit characters as given above.

CC. Corymbs at flowering time villous or pubescent

divergens Sarg. Stamens sometimes only 10. Fruit characters as given above.

Margaretta Ashe. Corymbs usually glabrous. Fruit characters as given above.

noveboracensis Sarg. Fruit subglobose to short-oblong, crimson, pale dotted, about 10 mm. diameter.

Oakesiana Egglest. Fruit pyriform to oblong, yellowish-red, about 10 mm. diameter.

XIII. Microcarpae

A. Anthers pink or rose; stamens about 20

apiifolia Michx. Fruit short-oblong, bright scarlet, 4–5 mm. diameter. Leaves pubescent, deeply lobed.

Phaenopyrum Medic. Fruit subglobose, scarlet, 4–6 mm. diameter. Leaves glabrous, slightly lobed.

AA. Anthers cream or yellow; stamens about 20

spathulata Michx. Fruit subglobose, bright scarlet, 4–5 mm. diameter. Leaves narrow, spatulate.

Youngii Sarg. Fruit globose to subglobose, scarlet, 5–7 mm. diameter. Leaves broadly ovate or deltoid in outline.

XIV. Flavae

A. Anthers pink, rose or purple (AA see p. 117)
B. Stamens about 10
C. Leaves at flowering time glabrous or nearly so

alleghaniensis Beadle. Fruit globular-pyriform, red, 8–12 mm. diameter.

frugiferens Beadle. Fruit globose or subglobose, red, 9–13 mm. diameter. Leaves sometimes slightly villous.

CC. Leaves at flowering time villous or pubescent

frugiferens Beadle. Leaves usually glabrous or nearly so. Fruit characters as given above.

villaris Beadle. (?) Fruit pyriform, yellow or orange-yellow flushed with red, 8–11 mm. diameter. Floral characters unknown.

BB. Stamens about 20 (15–20)
C. Leaves at flowering time glabrous or nearly so

adunca Beadle. Fruit globose, red, 12–15 mm. diameter.

clara Beadle. Fruit globose, orange-red, 9–12 mm. diameter. Leaves at flowering time sometimes slightly villous.

extraria Beadle. Fruit subglobose or oval, red, 9–12 mm. diameter.

ignava Beadle. Fruit globose or subglobose, red or orange-red, 8–12 mm. diameter.

limata Beadle. Fruit globose, red, 10–13 mm. diameter.

quaesila Beadle. Fruit subglobose or slightly pyriform, red and orange, 8–11 mm. diameter. Young leaves sometimes slightly villous.

sodalis Beadle. (?) Fruit pyriform, orange-red, 8–12 mm. diameter. Leaves sometimes slightly villous. Color of anthers unknown.

valida Beadle. Fruit subglobose, color not given, 12–15 mm. diameter.

CC. Leaves at flowering time villous or pubescent

arrogans Beadle. Fruit short-oval to slightly pyriform, red, 9–10 mm. diameter.

clara Beadle. Leaves usually nearly glabrous at flowering time. Fruit characters as given above.

colonica Beadle. (?) Fruit pyriform, orange-red, 10–13 mm. diameter. Color of anthers unknown.

condigna Beadle. Fruit subglobose or pyriform, red or orange and greenish, 6–8 mm. diameter.

consanguinea Beadle. Fruit globose to depressed-globose, red, 9–12 mm. diameter.

egregia Beadle. Fruit subglobose, orange or flushed with red, 10–12 mm. diameter.

flava Ait. Leaves at flowering time sometimes nearly glabrous. Fruit characters as given above.

illudens Beadle. (?) Fruit pyriform, yellow, 8–11 mm. diameter. Color of anthers unknown.

invicta Beadle. (?) Fruit pyriform, color not given, 6–8 mm. diameter. Color of anthers unknown.

lepida Beadle. (?) Fruit subglobose, orange or orange-red, 7–11 mm. diameter. Color of anthers unknown.

Michauxii Pers. (?) Fruit subglobose, red or ruddy, 8–12 mm. diameter. Color of anthers unknown.

munda Beadle. (?) Fruit pyriform, color not given, 7–9 mm. diameter. Leaves sometimes nearly glabrous. Color of anthers unknown.

pexa Beadle. Fruit globose, color not given, 7–9 mm. diameter. Color of anthers unknown.

quaesita Beadle. Leaves sometimes glabrous or nearly so. Fruit characters as given above.

segnis Beadle. (?) Fruit globose, red, 8–12 mm. diameter. Color of anthers unknown.

sodalis Beadle. (?) Leaves sometimes nearly glabrous. Color of anthers unknown. Fruit characters as given above.

tristis Beadle. Fruit short-oval, red or orange-red, 10–12 mm. diameter.

vicenda Beadle. Fruit pyriform, yellow or flushed with red, 10–12 mm. diameter.

yadkinensis Ashe. (?) Fruit pyriform or subglobose, dull red or orange, 7–11 mm. diameter. Color of anthers unknown.

AA. Anthers white, cream or yellow

B. Stamens about 10 (5–10)

C. Leaves at flowering time glabrous or nearly so

impar Beadle. Fruit oval, red, 10–13 mm. diameter. Stamens sometimes 15 or more.

CC. Leaves at flowering time villous or pubescent

aprica Beadle. Fruit globose, red or orange-red, 9–14 mm. diameter.

mira Beadle. Fruit subglobose, color not given, 10–12 mm. diameter. Stamens sometimes 15–20.

BB. Stamens about 20

C. Leaves at flowering time glabrous or nearly so

abdita Beadle. Fruit globose, red, 10–15 mm. diameter. Leaves sometimes slightly villous.

attrita Beadle. Fruit subglobose, yellow, splashed with red, 10–14 mm. diameter. Leaves sometimes slightly villous.

calva Beadle. Fruit globose, yellow or orange-red, 7–10 mm. diameter.

impar Beadle. Stamens sometimes only 10. Fruit characters as given above.

lacrimata Beadle. Fruit globose or subglobose, yellow or orange and red, 8–10 mm. diameter.

sodalis Beadle. (?) Leaves at flowering time sometimes slightly villous. Color of anthers unknown. Fruit characters as given above.

sororia Beadle. Fruit globose, red or red and yellow, 12–18 mm. diameter. Leaves usually somewhat villous.

teres Beadle. Fruit oblong, red, 8–10 mm. diameter.

CC. Leaves at flowering time villous or pubescent

abdita Beadle. Leaves sometimes glabrous or nearly so. Fruit characters as given above.

adusta Beadle. Fruit short-pyriform, orange-red, spotted and streaked with red, 9–11 mm. diameter.

alabamensis Beadle. Fruit oval, red, 10–15 mm. diameter.

amica Beadle. Fruit subglobose, orange, blotched with red, 10–13 mm. diameter.

anisophylla Beadle. Fruit globose or subglobose, orange or orange and red, 6–8 mm. diameter.

annosa Beadle. Fruit subglobose or oval, orange-red or red and orange, 10–12 mm. diameter.

arguta Beadle. Fruit globose, red, 7–9 mm. diameter.

attrita Beadle. Leaves usually glabrous or nearly so. Fruit characters as given above.

audens Beadle. Fruit pyriform, orange-yellow flushed with red, 9–12 mm. diameter.

colonica Beadle. (?) Color of anthers unknown. Fruit characters as given above.

cirrata Beadle. Fruit globose or subglobose, red, 7–9 mm. diameter.

compitalis Beadle. Fruit subglobose or oval, red, 10–13 mm. diameter.

constans Beadle. Fruit subglobose or slightly pyriform, bright orange-red, 10–12 mm. diameter.

crocea Beadle. Fruit pyriform, yellow to russet-red, 9–12 mm. diameter.

cullasagensis Ashe. Fruit globular or slightly oblong, dark orange, mottled with orange-red and crimson, 10–14 mm. diameter.

curva Beadle. Fruit pyriform, orange or orange and red, 6–9 mm. diameter.

dapsilis Beadle. Fruit globose or subglobose, yellow or orange and red, 10–15 mm. diameter.

dispar Beadle. Fruit subglobose or oval, red, 7–10 mm. diameter.

dolosa Beadle. Fruit globose or short-oval, yellow or orange, 9–12 mm. diameter.

egens Beadle. Fruit subglobose or slightly oval, orange-red or orange and red, 9–11 mm. diameter.

exilis Beadle. Fruit globose or subglobose, red or ruddy, 5–7 mm. diameter.

florens Beadle. Fruit globose, orange-red, 10–15 mm. diameter.

floridana Sarg. Fruit obovoid or short-oblong, bright orange-red, pale dotted, 7–9 mm. diameter.

frugalis Beadle. Fruit subglobose, red, 7–9 mm. diameter.

furtiva Beadle. Fruit pyriform, orange or orange and red, 7–9 mm. diameter.

galbana Beadle. Fruit globose, red, 9–13 mm. diameter.

geniculata Ashe. (?) Fruit pyriform, lemon-yellow or orange mottled with red, 7–12 mm. diameter. Color of anthers unknown.

illudens Beadle. (?) Color of anthers unknown. Fruit characters as given above.

incana Beadle. Fruit pyriform, orange-yellow or orange and red, 8–9 mm. diameter.

inopina Beadle. Fruit pyriform, yellow or orange-yellow and red, 8–11 mm. diameter.

inops Beadle. Fruit globose, orange or orange and red, 10–14 mm. diameter.

insidiosa Beadle. Fruit oval or subglobose, red, 9–12 mm. diameter.

integra Beadle. Fruit globose, red, 10–15 mm. diameter.

invicta Beadle. (?) Color of anthers unknown. Fruit characters as given above.

lanata Beadle. Fruit globose, color not given, 8–11 mm. diameter.

lassa Beadle. Fruit pyriform, orange-red, 8–10 mm. diameter.

laxa Beadle. Fruit subglobose or short-oblong, red, 7–9 mm. diameter.

lepida Beadle. (?) Color of anthers unknown. Fruit characters as given above.

meridiana Beadle. Fruit pyriform, orange, yellow or yellow flushed with red, 7–9 mm. diameter.

Michauxii Pers. (?) Color of anthers unknown. Fruit characters as given above.

munda Beadle. (?) Color of anthers unknown. Fruit characters as given above.

panda Beadle. Fruit globose or depressed-globose, orange-red or orange tinged with red, 10–15 mm. diameter.

pexa Beadle. (?) Color of anthers unknown. Fruit characters as given above.

pulla Beadle. Fruit subglobose to oval, orange-yellow flushed with red. 9–12 mm. diameter.

Ravenelii Sarg. Fruit globose to short-oblong, bright orange-red, dark dotted, 10–12 mm. diameter.

recurva Beadle. Fruit pyriform or short-pyriform, red, 7–9 mm. diameter.

resima Beadle. Fruit pyriform, orange-red, blotched with red, 9–11 mm. diameter.

rimosa Beadle. Fruit short-pyriform, yellow or orange-yellow and red, 9–12 mm. diameter.

segnis Beadle. Color of anthers unknown. Fruit characters as given above.

senta Beadle. Fruit globose, red, 10–14 mm. diameter.

sodalis Beadle. (?) Color of anthers unknown. Fruit characters as given above.

sororia Beadle. Leaves sometimes nearly or quite glabrous. Fruit characters as given above.

versuta Beadle. Fruit short-pyriform, orange or greenish-yellow and red, 6–9 mm. diameter.

vicana Beadle. Fruit pyriform or oblong-pyriform, yellow or orange, blotched with red, 10–14 mm. diameter.

yadkinensis Ashe. (?) Color of anthers unknown. Fruit characters as given above.

XV. Bracteatae

Anthers yellow; stamens about 20 (15–20); corymbs at flowering time villous or pubescent

Ashei Beadle. Fruit subglobose or short-oval, bright red, 10–14 mm. diameter.

Harbisonii Beadle. Fruit globose, red, 10–13 mm. diameter.

XVI. Triflorae

Anthers white, cream or yellow in this group

A. Stamens about 10

austromontana Beadle. Fruit globose, bright red, 12–15 mm. diameter.

AA. Stamens about 20

conjungens Sarg. Fruit subglobose, orange-red, about 10 mm. diameter.

triflora Chapman. Fruit globose, red, 12–15 mm. diameter.

XVII. Uniflorae

A. Anthers pink, rose or purple; stamens about 20

arenicola Ashe. (?) Fruit pyriform, orange or orange-red, 8–10 mm. diameter. Color of anthers unknown.

bisulcata Ashe. (?) Fruit pyriform, yellow or greenish-yellow, 10–12 mm. diameter. Color of anthers unknown.

Croomiana Sarg. Fruit obovoid, yellow or greenish-yellow, 8–9 mm. diameter.

rhodella Ashe. Fruit pyriform, orange and red, 8–12 mm. diameter.

raleighensis Ashe. (?) Fruit globular, yellow or greenish, 7–9 mm. diameter. Color of anthers unknown.

AA. Anthers white, cream or yellow; stamens about 20

arenicola Ashe. (?) Color of anthers unknown. Fruit characters as given above.

armentalis Beadle. Fruit globose, red, about 10 mm. diameter.

bisulcata Ashe. (?) Color of anthers unknown. Fruit characters as given above.

Brittonii Egglest. Fruit globose or short-pyriform, reddish-brown, 8–12 mm. diameter.

choriophylla Sarg. Fruit subglobose to slightly obovoid, orange-red, 10–12 mm. diameter.

Earlei Ashe. Fruit pyriform, yellow or greenish-yellow, 7–9 mm. diameter.

gregalis Beadle. Fruit pyriform, red or ruddy, 10–14 mm. diameter.

raleighensis Ashe. (?) Color of anthers unknown. Fruit characters as given above.

Smithii Sarg. Fruit short-oblong, orange or orange-green, about 12 mm. diameter.

trianthophora Sarg. Fruit obovoid, light orange-red, pale dotted, 8–12 mm. diameter.

uniflora Moench. Fruit subglobose, yellow or greenish-yellow, 10–14 mm. diameter.

XVIII. Aestivales

Anthers red, rose or purple in this group

A. Young leaves and branchlets glabrous or nearly so

aestivalis T. & G. Fruit short-oblong or subglobose, scarlet, 12–15 mm. diameter.

fruticosa Sarg. Fruit subglobose, light orange-red, pale dotted, about 10 mm. diameter. Young leaves sometimes slightly villous.

monantha Sarg. Fruit subglobose or short-oblong, cherry-red, 8–10 mm. diameter. Young leaves sometimes slightly villous.

AA. Young leaves and branchlets villous

fruticosa Sarg. Young leaves usually nearly glabrous. Fruit characters as given above.

monantha Sarg. Young leaves sometimes slightly villous. Fruit characters as given above.

opaca Hook. Fruit depressed-globose, scarlet, pale dotted, 15–20 mm. diameter.

rufula Sarg. Fruit subglobose, scarlet, about 12 mm. diameter.

XIX. Brachyacanthae

Anthers yellow; stamens about 20

brachyacantha Sarg. & Engelm. Fruit subglobose or obovoid, bright blue (straw-color in var. leucocarpa Sarg.), 12–15 mm. diameter.

saligna Greene. Fruit globose, blue-black, 5–8 mm. diameter.

XX. Douglasianae

A. Anthers pink, rose or purple

B. Stamens about 10 (5–10)

C. Corymbs and leaves glabrous or nearly so at flowering time

cerronis Nelson. Fruit globose, red, 8–10 mm. diameter.

erythropoda Ashe. Fruit subglobose, red or orange and red, 7–8 mm. diameter.

Douglasii Lindl. Fruit short-oblong, black (chestnut-color in f. badia Sarg.), 10–12 mm. diameter. Corymbs sometimes slightly villous. Stamens sometimes 20.

CC. Corymbs and leaves villous at flowering time

Douglasii Lindl. Corymbs usually glabrous. Fruit characters as given above. Stamens sometimes 20.

rivularis Nutt. Fruit short-oblong, crimson, pale dotted, becoming black, about 10 mm. diameter.

BB. Stamens about 20

Douglasii Lindl. Stamens sometimes 5–10. Fruit characters as given above.

AA. Anthers white, cream or yellow; stamens about 10 (5–10); corymbs and leaves villous at flowering time

colorado Ashe. Fruit subglobose, bright red, 7–8 mm. diameter.

columbiana Howell. Fruit obovoid, scarlet, 8–12 mm. diameter.

Piperi Britton. Fruit spherical or nearly so, coral-red, about 12 mm. diameter.

XXI. Anomalae

Anthers pink, rose or purplein this group

A. Stamens about 10 (5–10)

B. Corymbs at flowering time glabrous or nearly so

asperifolia Sarg. Fruit oblong, bright scarlet, about 10 mm. diameter. Corymbs sometimes slightly villous.

Brockwayae Sarg. Fruit short-oblong to slightly obovoid, dark vinous-purple, 10–12 mm. diameter.

cyclophylla Sarg. Fruit subglobose to short-oblong, orange-red, pale dotted, about 10 mm. diameter.

Dunbarii Sarg. Fruit subglobose, crimson, dark dotted, 12–14 mm. diameter. Corymbs sometimes slightly villous.

Egglestonii Sarg. Fruit oblong, orange becoming crimson, pale dotted, about 10 mm. diameter. Corymbs sometimes slightly villous.

floridula Sarg. Fruit short-oblong to obovoid, crimson, 7–8 mm. diameter.

improvisa Sarg. Fruit obovoid-oblong, orange-red, 8–9 mm. diameter.

inopinata Sarg. Fruit subglobose, dark red, pale dotted, 7–9 mm. diameter. Corymbs sometimes slightly villous.

Knieskerniana Sarg. Fruit short-oblong, scarlet, pale dotted, 10–11 mm. diameter.

scabrida Sarg. Fruit subglobose, scarlet, 8–12 mm. diameter. (Anthers described as pale yellow, but are pink or purple in specimens.)

BB. Corymbs at flowering time villous

affinis Sarg. Fruit short-oblong, oval or slightly obovoid, orange-red with pale lenticles, 9–10 mm. diameter.

asperifolia Sarg. Corymbs usually glabrous or nearly so. Fruit characters as given above.

Dunbarii Sarg. Corymbs often glabrous or nearly so. Fruit characters as given above.

Egglestonii Sarg. Corymbs sometimes glabrous or nearly so. Fruit characters as given above.

honesta Sarg. Fruit subglobose, cherry-red, pale dotted, 7–8 mm. diameter.

Ideae Sarg. Fruit short-oblong to subglobose, crimson, pale dotted, about 10 mm. diameter.

inopinata Sarg. Corymbs sometimes nearly glabrous. Fruit characters as given above.

misella Sarg. Fruit short-oblong, crimson, pale dotted, about 10 mm. diameter.

pinguis Sarg. Fruit short-oblong, crimson, pale dotted, 8–10 mm. diameter.

repulsans Sarg. Fruit short-oblong to subglobose, orange-red, pale dotted, 9–10 mm. diameter.

AA. Stamens about 20 (15–20)

C. Corymbs at flowering time glabrous or nearly so

brachyloba Sarg. Fruit short-oblong to obovoid, orange-red with pale lenticles, 8–10 mm. diameter.

Coleae Sarg. Fruit subglobose, bright orange-red, pale dotted, 8–10 mm. diameter.

errata Sarg. Fruit short-oblong, dark red with pale lenticles, 10–12 mm. diameter.

fallsiana Sarg. Fruit subglobose, scarlet, pale dotted, 14–15 mm. (or less) diameter.

putata Sarg. Fruit oval, orange-red, dark dotted, about 8 mm. diameter.

Seelyana Sarg. Fruit short-oblong, dull orange-red, about 7 mm. diameter.

urbana Sarg. Fruit short-oblong, crimson, pale dotted, 9–10 mm. diameter.

CC. Corymbs at flowering time villous

Saundersiana Sarg. Fruit short-oblong, ovoid or depressed-globose, orange-red, with pale lenticles, about 10 mm. diameter.

shirleyensis Sarg. Fruit subglobose to short-oblong, orange-red, about 10 mm. diameter.

virilis Sarg. Fruit short-oblong to ovoid, scarlet, dark dotted, 8–9 mm. diameter.

XXII. Macracanthae

A. Anthers pink, rose or purple (AA see p. 127)

B. Stamens about 10 (BB see p. 125)

C. Corymbs at flowering time glabrous or nearly so

bristolensis Sarg. Fruit oval, bright scarlet, pale dotted, 10–12 mm. diameter.

cupulifera Sarg. Fruit globose to short-oblong, scarlet, dark dotted, about 10 mm. diameter. Corymbs sometimes slightly villous.

diaphora Sarg. Fruit ovoid, crimson, pale dotted, 13–15 mm. diameter. Corymbs sometimes slightly villous.

divida Sarg. Fruit short-oblong to subglobose, crimson with pale lenticles, 10–12 mm. diameter.

dumicola Sarg. Fruit subglobose, dark red, pale dotted, about 10 mm. diameter. Corymbs sometimes slightly villous.

laetifica Sarg. Fruit subglobose to ovoid, crimson, pale dotted, 10–14 mm. (or less) diameter. Stamens sometimes 15–20.

nuda Sarg. Fruit short-oblong to subglobose, bright red, about 10 mm. diameter.

Peckietta Sarg. Fruit ovoid, red or greenish-red, 9–11 mm. diameter.

CC. Corymbs at flowering time villous or pubescent

aquilonaris Sarg. Fruit oblong, dull greenish-red, 8–10 mm. diameter.

baccata Sarg. Fruit subglobose, orange-red, pale dotted, 7–8 mm. diameter.

Balkwillii Sarg. Fruit short-oblong, orange-red blotched with yellow, 7–8 mm. diameter.

Beckiana Sarg. Fruit subglobose to obovoid, crimson, pale dotted, about 10 mm. diameter.

Chapmanii Ashe. Fruit globose or subglobose, bright red, 8–10 mm. diameter.

coloradensis Nelson. Fruit globose, bright red, about 8 mm. diameter.

conspicua Sarg. Fruit subglobose to short-oblong, crimson, 8–10 mm. diameter. Stamens sometimes 20.

cupulifera Sarg. Corymbs sometimes nearly or quite glabrous. Fruit characters as given above.

Deweyana Sarg. Fruit subglobose to short-oblong, scarlet with pale lenticles, 10–12 mm. diameter.

diaphora Sarg. Corymbs sometimes nearly or quite glabrous. Fruit characters as given above.

dumicola Sarg. Corymbs sometimes glabrous. Fruit characters as given above.

fallax Ashe. (?) Fruit depressed-globose, crimson, mottled with green and olive, 13–16 mm. diameter. Color of anthers unknown.

fertilis Sarg. Fruit subglobose, short-oblong or rarely ovoid, dark red, pale dotted, about 10 mm. diameter.

flammea Sarg. Fruit short-oblong to subglobose, orange-red, pale dotted, 10–11 mm. diameter.

fulgens Sarg. Fruit sugblobose, crimson, pale dotted, 10–12 mm. diameter.

illinoiensis Ashe. Fruit globose, scarlet, dark dotted, 8–11 mm. diameter.

insperata Sarg. Fruit obovoid, light orange-red, 8–10 mm. diameter. (This species was described as having 20 stamens, probably through error.)

integriloba Sarg. Fruit subglobose, bright scarlet, with pale lenticles, 10–12 mm. diameter.

laurentiana Sarg. Fruit oblong, dark crimson, 8–10 mm. diameter.

obscura Sarg. Fruit obovoid, light orange-red, pale dotted, 9–10 mm. diameter.

ogdensbergensis Sarg. Fruit subglobose to short-oblong, crimson, pale dotted, 9–11 mm. diameter.

prinoides Sarg. Fruit globose or depressed-globose, scarlet, dark dotted, 8–9 mm. diameter.

prunifolia Pers. Fruit subglobose, dull crimson, 10–15 mm. diameter.

rhombifolia Sarg. Fruit subglobose, bright clear red, 8–9 mm. diameter.

Robinsonii Sarg. Fruit oblong to slightly obovoid, bright scarlet, dark dotted, 7–8 mm. diameter.

rupicola Sarg. Fruit subglobose to short-oblong, bright orange-red, 9–11 mm. diameter.

sheridana Nelson. (?) Fruit spherical, scarlet, 8–9 mm. diameter.

spinulosa Sarg. Fruit short-oblong, orange-red, 5–6 mm. diameter.

BB. Stamens about 20 (15–20)

C. Corymbs at flowering time glabrous or nearly so

Helenae Sarg. Fruit short-oblong or ovoid, scarlet, 8–10 mm. diameter.

laetifica Sarg. Stamens sometimes 15 or more. Fruit characters as given above.

menandiana Sarg. Fruit subglobose, scarlet, pale dotted, about 12 mm. diameter. Corymbs sometimes slightly villous.

micrantha Sarg. Fruit subglobose, orange-red, pale dotted, 7–8 mm. diameter.

neofluvialis Ashe. Fruit subglobose, greenish-orange or flushed with red, 6–10 mm. diameter. (Stamens described as 10–15, but apparently about 20.)

pisifera Sarg. Fruit subglobose, crimson, pale dotted, 7–8 mm. diameter. Corymbs sometimes slightly villous.

propixa Sarg. Fruit subglobose to ovoid, crimson, pale dotted, 7–8 mm. diameter.

radiosa Sarg. Fruit subglobose, bright cherry-red, about 10 mm. diameter.

rutila Sarg. Fruit subglobose, orange-red, pale dotted, 8–10 mm. diameter. Corymbs sometimes slightly villous.

simulata Sarg. Fruit short-oblong, dull orange-red, 7–9 mm. diameter. Corymbs sometimes slightly villous.

spinea Sarg. Fruit subglobose to short-oblong, dark red, dark dotted, 6–7 mm. diameter.

stenophylla Sarg. Fruit short-oblong to obovoid, orange-red, pale dotted, 8–9 mm. diameter. Corymbs sometimes slightly villous.

vaga Sarg. Fruit ovoid or oval, orange-red, 6–7 mm. diameter. Corymbs sometimes slightly villous.

CC. Corymbs at flowering time villous or pubescent

admiranda Sarg. Fruit subglobose to short-oblong or ovoid, bright cherry-red, pale dotted, 12–14 mm. diameter.

ardua Sarg. Fruit subglobose to short-oblong, crimson, pale dotted. 12–14 mm. diameter.

calpodendron Medic. (?) Fruit pyriform or ellipsoid, red or orange-red, 6–8 mm. diameter.

Calvinii Sarg. Fruit oval to ovoid, scarlet, pale dotted, 8–10 mm. diameter.

conspicua Sarg. Stamens 10–20, according to description. Fruit characters as given above.

diversa Sarg. Fruit oval or slightly obovoid. crimson, pale dotted, 6–7 mm. diameter.

efferata Sarg. Fruit subglobose, scarlet, pale dotted, 8–9 mm. diameter.

ensifera Sarg. Fruit oval, bright orange-red, pale dotted, 8–9 mm. diameter.

finitima Sarg. Fruit short-oblong to subglobose, orange-red, pale dotted. about 10 mm. diameter.

frutescens Sarg. Fruit short-oblong, scarlet, pale dotted, 7–8 mm. diam.

Gaultii Sarg. Fruit subglobose to short-oblong, scarlet becoming dark crimson, 12–14 mm. diameter.

gemmosa Sarg. Fruit subglobose to short-oblong, scarlet, 12–14 mm. diameter.

globosa Sarg. Fruit globose to short-oblong, bright orange-red, dark dotted, 7–8 mm. diameter.

hispidula Sarg. Fruit obovoid, orange-red, 7–8 mm. diameter

honeoyensis Sarg. Fruit short-oblong or slightly ovoid, scarlet, pale dotted, 8–10 mm. diameter.

longispina Sarg. Fruit subglobose, scarlet, pale dotted, 8–10 mm. diam.

manandiana Sarg. Corymbs sometimes glabrous or nearly so. Fruit characters as given above.

missouriensis Ashe. Fruit pyriform or becoming subglobose, deep scarlet, 9–10 mm. diameter.

obesa Ashe. (?) Fruit globose or slightly oblong, scarlet, 8–9 mm. diameter. Color of anthers unknown.

pisifera Sarg. Corymbs sometimes glabrous or nearly so. Fruit characters as given above.

pubifolia Ashe. Fruit subglobose to short-oblong, scarlet or orange-red, 6–8 mm. diameter.

rutila Sarg. Corymbs sometimes nearly or quite glabrous, Fruit characters as given above.

saeva Sarg. Fruit subglobose to short-oblong, crimson, pale dotted, 8–10 mm. diameter.

scabera Sarg. Fruit subglobose to slightly ovoid, bright cherry-red, dark dotted, about 10 mm. diameter.

simulata Sarg. Corymbs sometimes glabrous or nearly so. Fruit characters as given above.

sonnenbergensis Sarg. Fruit subglobose or short-oblong, crimson, about 10 mm. diameter.

spinifera Sarg. Fruit subglobose to slightly ovoid, scarlet, pale dotted, 10–12 mm. diameter.

stenophylla Sarg. Corymbs sometimes glabrous or nearly so. Fruit characters as given above.

succulenta Schrad. Fruit globose, bright scarlet, 6–8 mm. diameter.

tomentosa L. Fruit obovoid, rarely subglobose, dull orange-red, 5–10 mm. diameter.

vaga Sarg. Corymbs sometimes glabrous or nearly so. Fruit characters as given above.

Vailiae Britton. Fruit subglobose, yellowish-green becoming red, 8–10 mm. diameter.

vegeta Sarg. Fruit subglobose, scarlet, pale dotted, 8–10 mm. diameter.

AA. Anthers white, cream or yellow

B. Stamens about 10 (5–10)

C. Corymbs at flowering time glabrous or nearly so

chadfordiana Sarg. Fruit subglobose, scarlet, pale dotted, 12–14 mm. diameter.

delectabilis Sarg. Fruit obovoid, scarlet, pale dotted, 8–9 mm. diameter. Corymbs sometimes slightly villous.

Doddsii Ramaley. Fruit pyriform, bright red, about 9 mm. diameter.

Emersoniana Sarg. Fruit globose to subglobose, scarlet, pale dotted, 12–14 mm. diameter.

glabrata Sarg. Fruit subglobose, crimson blotched with yellow, pale dotted, 8–9 mm. diameter.

Handyae Sarg. Fruit subglobose, bright scarlet, pale dotted, 10–12 mm. diameter.

peramoena Sarg. Fruit short-oblong to ovoid, light scarlet blotched with yellow, pale dotted, 8–10 mm. diameter.

picta Sarg. Fruit subglobose, scarlet, pale dotted, 8–9 mm. diameter.

spatiosa Sarg. Fruit oval to globose or depressed-globose, scarlet blotched with yellow, pale dotted, 12–14 mm. diameter.

venustula Sarg. Fruit subglobose, crimson, pale dotted, about 10 mm. diameter.

CC. Corymbs at flowering time villous or pubescent

agaia Sarg. Fruit subglobose to short-oblong, dark crimson, pale dotted, 10–12 mm. diameter.

armigera Sarg. Fruit short-oblong to ovoid, crimson, pale dotted, 8–10 mm. diameter.

coloradoides Ramaley. Fruit globose, red or purplish, about 9 mm. diam.

crux Ashe. Fruit subglobose, bright scarlet, about 13 mm. diameter.

debilis Sarg. Fruit short-oblong, scarlet, 9–11 mm. diameter.

delectabilis Sarg. Corymbs sometimes glabrous or nearly so. Fruit characters as given above.

Doddsii Ramaley. Corymbs sometimes nearly glabrous. Fruit characters as given above.

fallax Ashe. (?) Color of anthers unknown. Fruit characters as above.

ferentaria Sarg. Fruit subglobose to short-oblong, crimson, pale dotted, about 12 mm. diameter.

flagrans Sarg. Fruit subglobose, dark crimson, 8–10 mm. diameter.

fulgida Sarg. Fruit subglobose, dark crimson, pale dotted, 10–12 mm. diameter.

hystricina Ashe. Fruit subglobose, bright scarlet, about 10 mm. diameter.

macracantha Lodd. Fruit globose, crimson, 5–6 mm. diameter.

microsperma Sarg. Fruit short-oblong to subglobose, crimson, pale dotted, 7–10 mm. diameter.

mollicula Sarg. Fruit subglobose to short-oblong, bright orange-red, pale dotted, 10–12 mm. diameter.

Laneyi Sarg. Fruit subglobose, dark orange-red, pale dotted, about 6 mm. diameter.

pellucidula Sarg. Fruit subglobose, scarlet, pale dotted, 12–14 mm. diameter.

peramoena Sarg. Corymbs sometimes nearly or quite glabrous. Fruit characters as given above.

pertomentosa Ashe. Fruit subglobose, red or yellowish (becoming dark red), 6–9 mm. diameter.

praeclara Sarg. Fruit subglobose to ovoid, crimson, 8–10 mm. diameter.

pudens Sarg. Fruit short-oblong, green or yellowish-red, 8–9 mm. diam.

Searsii Sarg. Fruit subglobose, crimson, pale dotted, 8–10 mm. diameter.

stratfordensis Sarg. Fruit oval, greenish-yellow mottled with crimson, 7–8 mm. diameter.

BB. Stamens about 20 (15–20)

C. Corymbs at flowering time glabrous or nearly so

opica Ashe. Fruit depressed-globose, crimson, about 12 mm. (or less) diameter. Corymbs sometimes finely pubescent.

tanuphylla Sarg. Fruit short-oblong, crimson, 7–10 mm. diam.

vernans Ashe. Fruit globose, bright scarlet, 9–12 mm. diameter. Corymbs sometimes slightly villous.

CC. Corymbs at flowering time villous or pubescent

ambrosia Sarg. Fruit short-oblong, crimson, dark dotted, 8–12 mm. diameter.

carrollensis Sarg. Fruit ellipsoidal, dark red, 6–7 mm. diameter.

comans Sarg. Fruit short-oblong to subglobose, orange-red, 7–8 mm. diameter.

ferta Sarg. Fruit subglobose to short-oblong or ovoid, scarlet, pale dotted, 12–14 mm. (or usually less) diameter.

obesa Ashe. (?) Color of anthers unknown. Fruit characters as above.

opica Ashe. Corymbs sometimes nearly or quite glabrous. Fruit characters as given above.

structilis Ashe. Fruit oblong or pyriform, orange or reddish-orange dotted with dark green and russet, 7–10 mm. diameter.

truculenta Sarg. Fruit subglobose, dark red, pale dotted, 7–8 mm. diameter.

venulosa Sarg. Fruit subglobose to ovoid or short-oblong, orange-red, 7–8 mm. diameter.

vernans Ashe. Corymbs usually glabrous, according to description. Fruit characters as given above.

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ADDITIONS TO OUR KNOWLEDGE OF THE FLORA OF HAINAN

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In 1920 Mr. W. Y. Chun spent nearly a year in a botanical exploration of Hainan, but no general study has as yet been made of his extensive collection of over 3000 numbers. A partial set of the material collected by him is in the herbarium of the University of Nanking and from this set about 500 duplicates have been sent to me by Mr. A. N. Steward of that Institution for identification. The Chun collections thus far received supply several important additions to our knowledge of the Chinese flora, in this short paper representatives of nine genera being recorded for the first time from China: *Dacrydium*, *Phyllochlamys*, *Popowia*, *Orophea*, *Drypetes*, *Calpigyne*, *Apodytes*, *Lithosanthes* and *Smythea*, several of these being represented by previously undescribed forms.

I have previously published several papers on the flora of Hainan,[1] and previous to my departure from Manila in November, 1923, prepared a manuscript enumeration of Hainan plants. This contains the record of approximately 1100 species of flowering plants and ferns from the island, but manifestly the flora is much richer than this preliminary enumeration would indicate.

My papers were for the most part based on extensive botanical collections made in Hainan by Mr. F. A. McClure of the Canton Christian College, who made two trips to the island, one from September to December, 1921, and the other from March to May, 1922. An enumeration of the McClure collection is in process of publication by Mr. G. W. Groff and his colleagues in the Canton Christian College, three parts having already been issued carrying the enumeration from the Filices through the Solanaceae.[2]

[1] Merrill, E. D. Two new species of plants from Hainan. (Philip. Jour. Sci. XIX 677–679 [1921]); Diagnoses of Hainan plants. (op. cit. XXI. 337–355 [1922]); Diagnoses of Hainan plants II. (op. cit. XXIII. 237–268 [1923]).

[2] Groff, G. W., E. Ding and E. H. Groff. An enumeration of the McClure collection of Hainan plants. (Lingnaam Agric. Review, I. pt. II. 27–86 [1923], II. 9–44 [1924]; 115–139 [1925]).

Mr. McClure has published a very interesting and instructive account of his trips in Hainan.[1]

Hainan is located within the tropics being in approximately the same latitude as the Hawaiian Islands and the northernmost part of the Philippine Archipelago. Naturally we find represented here a number of genera chiefly tropical in character, that do not occur in the continental part of southern China.

The actual types of the species described in this paper are deposited in the herbarium of the University of California, and fragments of all of them have been placed in the herbarium of the Arnold Arboretum; duplicates are in the herbarium of the University of Nanking.

TAXACEAE

Dacrydium Solander

Dacrydium elatum (Roxb.) Wallich in Hooker, Jour. Bot. II. 144, t. 2 (1843).

Juniperus elata Roxburgh, Fl. Ind. ed. 2, III. 838 (1832).

HAINAN: Five Finger Mountains, along streams, altitude 1350 m. W. Y. CHUN, nos. 1367, 2989, April and June, 1920.

No. 1367 represents a juvenile form.

Indochina to Sumatra, Borneo, the Philippines, and Celebes. The genus is new to China.

MORACEAE

Taxotrophis Blume

Taxotrophis macrophylla (Blume) Boerlage, Handl. Fl. Nederl. Ind. III. 379 (1900).

HAINAN: road to Tahun, in ravines, *W. Y. Chun*, no. 1239, April 9, 1920.

In the absence of staminate flowers it is difficult to distinguish between *Balanostreblus ilicifolia* Kurz and *Taxotrophis ilicifolia* Vidal. Hutchinson[2] has cleared up the confusion between these two genera and species. He accepts the name *Taxotrophis ilicifolia* Vidal for this form, which extends from Burma and Chittagong to Indochina, the Malay Peninsula, Philippines, Celebes and the Moluccas. I have, however, accepted the older specific name given above, based on *Streblus macrophyllus* Blume (*Diplocos macrophylla* Bureau) from Celebes. The genus is new to China, except for Hemsley's record of *Taxotrophis* sp. from Hainan (*Henry*, no. 8703), this specimen probably representing the same species as Chun's no. 1239.

[1] McClure, F. A. Notes on the Island of Hainan. (Lingnaam Agric. Review, I. pt. I. 66–86, pl. 1–5, map [1922]).

[2] In Kew Bull. Misc. Inform. 1918, 150.

Phyllochlamys Bureau

Phyllochlamys taxoides (Heyne) Koorders, Exkursionsfl. Java, II. 89 (1912)

Taxotrophis taxoides Heyne in Roth, Nov. Pl. Sp. 368 (1821).
Trophis spinosa Roxburgh, Fl. Ind. ed. 2, III. 762 (1832).
Phyllochlamys spinosa Bureau in De Candolle, Prodr. XVII. 218 (1873).

HAINAN: road to Kunguier, in groves, *W. Y. Chun*, no. 2124, July 4, 1920.

India and Ceylon to Indochina, Java, Palawan, and Timor. The genus is new to China.

ANONACEAE

Fissistigma Griffith

Fissistigma hainanense, nom. nov.

Fissistigma maclurei Merrill in Philip. Jour. Sci. XXIII. 241 (1923), non *F. maclurei* Merrill, op. cit. XXI. 342 (1922).

HAINAN: Five Finger Mountains, *F. A. McClure*, no. 9733, *W. Y. Chun*, no. 1606.

Through oversight the same specific name was used for two entirely different species, so that this change in the name accompanying the second description becomes necessary.

Popowia Endlicher

Popowia pisocarpa (Blume) Endlicher in Walpers Rep. I. 252 (1842).

Guatteria pisocarpa Blume, Bijdr. 21 (1825).
Bocagea pisocarpa Blume, Fl. Jav. Anon. 90, t. 45 (1828).

HAINAN: Fan Ta, southwest slope of Five Finger Mountain, in forests, *W. Y. Chun*, no. 1918, June 6, 1920.

The specimen agrees closely with the descriptions of this species and with Blume's plate, as well as with named material available for purposes of comparison. My conception of this species includes *Popowia ramossima* Hook. f. & Th., and the Philippine *Popowia polyandra* (Presl) Merr. I would call attention to the fact that Gagnepain's interpretation of the genus *Popowia* includes those forms that Ridley[1] places in the genus *Sphaerocoryne* Scheffer but I feel absolutely confident that *Sphaerocoryne* is identical with *Melodorum* as originally characterized by Loureiro, and that consequently *Sphaerocoryne* Scheff. is a synonym of *Melodorum* Lour., while *Melodorum* of all modern authors is *Fissistigma* Griff., as I have previously indicated.[2] This interpretation of Loureiro's genus is verified by the type specimen of *Melodorum fruticosum* Lour. in the herbarium of the British Museum. Synonyms of *Melodorum fruticosum* Lour., as I understand the species, are *Polyalthia aberrans* Maingay, *P. siamensis* Boerl., *P. affinis* Teysm. & Binn., *Popowia aberrans* Pierre,

[1] Ridley, H. N., Fl. Malay Penin. I. 61 (1922).

[2] Merrill, E. D. On the application of the generic name Melodorum of Loureiro. (Philip. Jour. Sci. XV. 125–137 [1919]).

Unona Mesneyi Pierre, *Sphaerocoryne aberrans* Ridl., and *Unona dumetorum* Dunal.

Popowia pisocarpa Endl. extends from the Malay Peninsula to Sumatra, Java, Borneo and the Philippines (southern Luzon to Mindanao), but has not been recorded from Indochina, although it almost certainly occurs there. The genus is new to China.

Orophea Blume

Orophea hainanensis, sp. nov.

Arbor parva, circiter 6 m. alta, ramulis junioribus inflorescentiisque leviter ciliatis exceptis glabra, ramulis tenuibus, junioribus vix 1 mm. diametro ciliatis, vetustioribus glabris; foliis chartaceis, in sicco pallidis, nitidis, oblongo-ellipticis, 4 ad 8 cm. longis, 2 ad 3.5 cm. latis, utrinque subaequaliter angustatis, apice distincte obtuseque acuminatis, basi acutis, nervis primariis utrinque circiter 7 distinctis; petiolo circiter 2 mm. longo glabro; inflorescentiis tenuibus, 2 ad 2.5 cm. longis, plerisque 1- vel 2-floris, parcissime ciliatis, pedunculo 1 ad 1.2 cm. longo, 1-bracteato, bracteis lanceolatis, acuminatis, ciliatis, 2 mm. longis, bracteolis plerumque solitariis, parvis; floribus longe (10 ad 12 mm.) pedicellatis; sepalis triangulari-ovatis, acutis, leviter pubescentibus, 1.5 ad 2 mm. longis; petalis exterioribus punctato-glandulosis, late ovatis ad suborbicularibus, acutis, circiter 4 mm. longis latisque, interioribus stipitatis, 7 ad 8 mm. longis, limbo rhomboideo, 4 mm. longo, 3.5 mm. lato, acuto vel obtuso, basi cuneato, intus rugoso; antheris, 6, connectivo curvato; carpellis 6, glabris 1 mm. longis.

HAINAN: Five Finger Mountains, *W. Y. Chun*, no. 1533, June 16, 1920 altitude indicated as 1700 m. which is probably too high; flowers yellow.

A strongly marked species well characterized by its glabrous leaves and its very slender, 1- or 2-flowered inflorescences. No representative of the genus has hitherto been recorded from China.

RUTACEAE

Evodia Forster

Evodia Chunii, sp. nov.

Arbor circiter 11 m. alta, novellis inflorescentiisque exceptis glabra, ramulis teretibus, circiter 2.5 mm. diametro, lenticellatis; foliis trifoliolatis, petiolo 3 ad 5 cm. longo, glabro; foliolis chartaceis vel membranaceis, in sicco fragilibus viridibus utrinque concoloribus nitidis oblongis obtusis vel breviter obtuse acuminatis, basi cuneatis vel decurrento-acuminatis, aequilateralibus vel leviter inaequilateralibus 7 ad 10 cm. longis et 2 ad 3 cm. latis, nervis primariis utrinque circiter 10 tenuibus distinctis arcuato-anastomosantibus, petiolulis 3 ad 4 mm. longis; cymis in axillis superioribus pedunculatis multifloris 3.5 ad 5 cm. longis leviter pubescentibus circiter 4 cm. diametro, pedunculo circiter 2 cm. longo; floribus albido-viridibus,

4-meris, pedicellis 2 ad 2.5 mm. longis, glabris, basi minute bracteolatis; sepalis late ovatis, rotundatis, 0.5 mm. longis, glabris; petalis oblongo-ellipticis, obtusis, 2 mm. longis; filamentis petalis aequantibus, glabris, antheris oblongis 0.8 mm. longis; ovario rudimenti villoso.

HAINAN: south slope of Five Finger Mountains opposite Suimahu Doong, in forests, *W. Y. Chun*, no. 2038.

The alliance of this species is clearly with *Evodia malayana* Ridley (Fl. Malay. Penins. I. 342 [1922]), which in turn may prove not to be distinct from *Evodia aromatica* Blume, differing in its smaller, fewer-nerved leaflets, smaller cymes, shorter peduncles, glabrous pedicels, and its broadly ovate not oblong sepals. It may have been included by Guillaumin[1] in his conception of *E. triphylla* DC., but this is unlikely, as Guillaumin's description and the specimens named by him that I have seen, represent *Evodia pteleaefolia* (Champ.) Merrill (in Philip. Jour. Sci. Bot. VII. 377 [1912]). *Evodia triphylla* (Lam.) DC. is *Melicope triphylla* (Lam.) Merr., as I have previously shown, this interpretation being based on an examination of Lamarck's type, a Philippine specimen, in Lamarck's herbarium at Paris. Many of the synonyms cited by Guillaumin belong with *Evodia pteleaefolia* Merr., but some of them are wrongly placed. *Zanthoxylum Lamarckianum* Cham. & Schlecht., belongs with *Melicope triphylla* Merr., the type also being a Philippine specimen, but *Evodia Lamarckiana* Benth. is a synonym of *E. pteleaefolium* (Cham.) Merr.[2]

SIMARUBACEAE

Brucea J. S. Miller

Brucea amarissima (Lour.) Desv. apud Gomes in Mem. Acad. Sci. Lisb. n. ser. IV, 30 (1872).—Merrill in Philip. Jour. Sci. X. 18 (1915).

Brucea sumatrana Roxburgh Hort. Bengal. 12 (1812); Fl. Ind. I. 469 (1820).

HAINAN: at low altitudes, *F. A. McClure*, nos. 7598, 8018, 8824. India to southeastern China through Malaysia to Australia.

This common and widely distributed species is recorded here merely to call attention to the proper authority for the transfer of Loureiro's specific name *Brucea amarissima* does not appear in Index Kewensis.

POLYGALACEAE

Xanthophyllum Roxburgh

Groff's Hainan record of *Xanthophyllum racemosum* Chod. was based on *McClure*, no. 9440, a specimen with immature fruits, following my identification. It is unfortunate that the name should have been printed without its synonym. *Xanthophyllum racemosum* Chodat is an herbarium name intended to indicate the form described by King and by Ridley as

[1] Lecomte, Fl. Gén. Indo-China I. 632 (1911).

[2] Merrill, E. D. On the identity of Evodia triphylla. (Philip. Jour Sci. Bot. VII. 373–378 [1912]; Enum. Philip. Pl. II. 331 [1923]).

Xanthophyllum palembanicum (non Miq.). If my identification of McClure's specimen is correct, in view of Ridley's statement that *Xanthophyllum Maingayi* Benn. is not specifically distinct from *X. palembanicum*, as described by King and by himself, perhaps there is no need for the binomial proposed by Dr. Chodat. In order to place the name *Xanthophyllum racemosum* Chod., the following synonymy is given.

Xanthophyllum racemosum Chodat apud Groff in Lingnaam Agric. Review, II. pt. I. 26 (1924), nomen.

Xanthophyllum palembanicum King in Jour. As. Soc. Bengal, LIX. pt. II. 137 (1890); Materials for a Flora of the Malayan Peninsula, I. 77 (1890).—Ridley, Fl. Malay. Penin. I. 149 (1922).—Non Miquel.

Xanthophyllum Maingayi Benn. in Hook. f., Fl. Brit. Ind. **1**: 210 (1874)?

Gagnepain[1] confines *Xanthophyllum palembanicum* Miq. to Sumatra and admits *Xanthophyllum Maingayi* Benn. as a valid species. It is interesting to note that neither *Xanthophyllum palembanicum* as interpreted by King and by Ridley, nor *X. Maingayi* Benn., which Ridley claims is identical with *X. palembanicum* as interpreted by King, are recorded from Indochina. In this connection it is suggested that perhaps the Hainan form should be compared with *Xanthophyllum colubrinum* Gagnepain (in Bull. Soc. Bot. France, LV. 35 [1909]; Lecomte, Fl. Gén. Indo-Chine, I. 244, t. 18 [1909]). Flowering material from Hainan is desirable in order to settle the exact status of the form that occurs in this island.

EUPHORBIACEAE

Drypetes Vahl

Drypetes hainanensis, sp. nov. (§ *Sphragidia*).

Arbor parva, circiter 7 m. alta, fructibus exceptis (floribus ignotis) glaberrima, ramis teretibus griseis, ramulis tenuibus, angulatis lenticellatis 1 ad 1.5 mm. diametro; foliis chartaceis oblongis integris, in sicco olivaceis, utrinque concoloribus nitidis, distincte reticulatis, 6 ad 9 cm. longis et 2 ad 3.5 cm. latis, utrinque angustatis, apice breviter obtuseque acuminatis, basi distincte inaequilateralibus, acutis, nervis primariis utrinque circiter 10 distinctis anastomosantibus; petiolo circiter 8 mm. longo; fructibus axillaribus solitariis vel binis sessilibus globosis 2 ad 2.5 cm. diametro fulvo-pulverulentis glabrescentibus, apice leviter umbilicatis, 2-locularibus, exocarpio fragili, endocarpio osseo, mesocarpio crasso spongioso.

HAINAN: northwest slope of Five Finger Mountains, in shade along streams, *W. Y. Chun*, no. 1734, May 27, 1920.

A species well characterized by its entire, somewhat acuminate leaves which are inequilateral and acute at the base; by its slender branchlets; by being entirely glabrous except for its deciduously fulvus-puberulent fruits, which at full maturity are glabrous or nearly so; and by its sessile,

[1] Gagnepain, F. Contribution à la connaissance des Xanthophyllum. (Jour. de Bot. XXI. 241–253 [1908]).

globose fruits which attain a diameter of 2.5 cm., the exocarp being pale brown and fragile, the mesocarp thick and spongy. Its alliance is apparently with two recently described species of Indochina, *Drypetes Poilanei* Gagnep. and *D. subsessilis* Gagnep.

Calpigyne Blume

Calpigyne hainanensis, sp. nov.

Frutex vel arbor parva (3 ad 8 m. alta, fide Chun), ramulis junioribus et petiolis et inflorescentiis dense stellato-tomentosis exceptis glabra, ramis glabris teretibus, ramulis circiter 1.5 mm. diametro; foliis oblongo-ellipticis ad oblongo-lanceolatis chartaceis, in sicco pallidis vel olivaceis, utrinque nitidis, 12 ad 19 cm. longis, 3 ad 8 cm. latis, acutis ad obscure acuminatis, basi plerisque leviter inaequilateralibus, subacutis ad rotundatis vel obscure auriculato-cordatis, margine crenulato-serratis vel crenatis crenulis glanduligeris; nervis primariis utrinque circiter 14 perspicuis arcuato-anastomosantibus curvato-adscendentibus, secondariis subparallelis, subrectis vel undulato-curvatis, distinctis; petiolo 5 ad 8 mm. longo, dense castaneo- vel subferrugineo-pubescente; stipulis lanceolatis, circiter 5 mm. longis, rigidis, incisis; inflorescentiis spicatis, axillaribus et ex axillis defoliatis, spicis numerosis tenuibus fasciculatis, 4 ad 6 mm. longis dense fulvo- vel cinereo-pubescentibus, indumento stellato; floribus inferioribus pistillatis paucis solitariis, superioribus omnibus staminatis glomeratim fasciculatis numerosis, quam pistillati multo minoribus; calyce floris pistillati ovoideo vel ellipsoideo, circiter 4 mm. longo, dense stellato-tomentoso, 5- vel 6-lobato, lobis ovatis 1.5 ad 2.5 mm. longis valvatis, alternis plerumque paullo minoribus; ovario dense stellato-tomentoso, ovoideo; stylis circiter 2 mm. longis, crassis, deorsum leviter connatis, curvatis, bifidis, eroso-laceratis, extus stellato-tomentosis, intus perspicue papillosis; floribus staminatis glomeratim fasciculatis, alabastro vix 1 mm. diametro, fasciculis 3- ad 7-floris, bracteis late ovatis 1.5 ad 2.5 mm. longis; calyce extus pubescente, lobis late ovatis valvatis membranaceis; staminibus 3 ad 5, plerumque 4, filamentis brevissimis crassis deorsum connatis, antheris subreniformibus, loculis subhorizontalibus introrsis, loculamentis inferioribus quam superioribus distincte minoribus.

HAINAN: Nam Fung, growing along streams (flowers pale yellow), *W. Y. Chun*, nos. 1092 (type), 1122, March 21 and 23, 1920.

Calpigyne has hitherto been a monotypic genus known only from the original collection or collections, as Blume in describing it in 1856 records it from both Borneo and Celebes. The original species *Calpigyne frutescens* Blume has apparently not appeared in recent collections, or if so it has not been recognized. While Blume's description is incomplete in some particulars, yet the present species conforms in essential generic characters to those given by him. *Calpigyne hainanensis* differing from *C. frutescens* in its chartaceous, crenate or crenulate-serrate leaves. The staminate calyces in the present species are equally or subequally 3-lobed (not 4-

lobed, with alternate longer and shorter lobes), while the filaments are very short and stout, not subulate-acuminate.

ICACINACEAE

Apodytes E. Meyer

Apodytes cambodiana Pierre, Fl. Forest. Cochinch. t. 267 (1892); Gagnepain in Lecomte, Fl. Gén. Indo-Chine, 1. 834. (1911).

Apodytes javanica Koorders & Valeton, Bijdr. Boomsoort. Java, v. 159 (1900).

HAINAN: northwest slope of Five Finger Mountain, *W. Y. Chun*, no. 2096, in forests apparently at high altitudes.

No representative of this genus has hitherto been recorded from China, the specimen cited above agreeing in all esential details with material from Indo-China and Java, as well as with the descriptions and Pierre's plate. It occurs in Indo-China and in Java, and according to Koorders,[1] also in India.

I strongly suspect that *Nothapodytes montana* Blume (*Mappia montana* Miq.), will prove to be the same as this, in which case Blume's specific name will replace Pierre's.

RHAMNACEAE

Smythea Seemann

Smythea nitida, sp. nov.

Frutex scandens, subglaber, ramis teretibus glabris olivaceis, ramulis tenuibus circiter 1 mm. diametro, junioribus parcissime ciliatis; foliis olivaceis nitidis chartaceis ovatis ad elliptico-ovatis, 3 ad 7 cm. longis et 1.5 ad 3 cm. latis, glaberrimis, basi aequilateralibus vel subaequilateralibus late rotundatis, apice breviter obtuseque acuminatis vel obtusis, margine distanter denticulatis, nervis lateralibus utrinque 4 vel 5, perspicuis, arcuato-adscendentibus; petiolo 3 ad 5 mm. longo, plus minusve hirsuto; floribus axillaribus fasciculatis 5-meris circiter 4 mm. diametro, fasciculis plerisque 4-floris, pedicellis 2 mm. longis; calycis lobis parcissime hirsutis triangularibus, acutis, 1.5 mm. longis, petalis parvis, obcordatis, retusis, vix 1 mm. longis, margine inflexis, dorsum angustatis, brevissime stipitatis; filamentis 1 mm. longis. Fructibus ignotis.

HAINAN: Five Finger Mountains, altitude about 1350 m., *W. Y. Chun*, no. 1465, May 6, 1920.

The first representative of the genus to be recorded from China, apparently most closely allied to *Smythea macrocarpa* Hemsl., but with differently shaped, fewer-nerved leaves which are broadly rounded and nearly equilateral at the base. Although the fruits are unknown, and without these it is difficult to distinguish between *Smythea* and *Ventilago*, I do not hesitate in referring the present species to *Smythea* because of its axillary fascicled flowers. From the description I strongly suspect that *Ventilago*

[1] Exkursionsfl. Java II. 532. (1912).

pauciflora Pitard of Indo-China belongs in *Smythea* rather than in *Ventilago*.

STERCULIACEAE

Heritiera Dryander

Heritiera parvifolia, sp. nov.

Arbor circiter 30 m. alta (fide Chun), ramis glabris, ramulis gracilibus, circiter 1 mm. diametro, dense lepidotis; foliis subcoriaceis, lanceolatis ad oblongo-lanceolatis, 6 ad 8 cm. longis, 1.5 ad 3 cm. latis, acuminatis, basi acutis ad subrotundatis, triplinerviis, in sicco pallidis, supra subolivaceis nitidis glaberrimis, subtus dense subargenteo- vel brunneo-lepidotis; nervis utrinque circiter 6, subtus distinctis; petiolo 1 ad 1.5 cm. longo, lepidoto; inflorescentiis axillaribus dense subferrugineo-stellato-tomentosis 3 ad 5 cm. longis; floribus circiter 4 mm. longis, calyce 5- vel 6-lobato, extus dense, intus leviter stellato-tomentoso, lobis oblongo-ovatis obtusis 1.5 ad 2 mm. longis; androphoro gracili, glabro 1 mm. longo, basi disco crasso 0.8 mm. diametro cincto; antheris 8 ad 10, 1-seriatis, in capitulis 0.8 mm. diametro dispositis. Fructibus ignotis.

HAINAN: northwest slope of Five Finger Mountains, *W. Y. Chun*, no. 2100, June 29, 1920, apparently in forests.

While by definition this species falls in *Heritiera*, on account of the thick disk surrounding the base of the androphore, yet I cannot escape the conviction that its true relationships are with the Philippine *Tarrietia sylvatica* (Vidal) Merr., and that when fruits are available it will probably be best to transfer it to the latter genus. In *Heritiera* it is well characterized by its small, few-nerved leaves.

FLACOURTIACEAE

Flacourtia L'Héritier

Flacourtia indica (Burm. f.) Merrill, Interpret. Herb. Amb. 377 (1917); Enum. Philip. Pl. III. 112 (1923).

Gmelina indica Burman f., Fl. Ind. 132, t. 39, fig. 5. (1768).
Flacourtia sepiaria Roxburgh, Pl. Coromandel, I. 48, t. 68 (1795).
Flacourtia Balansae Gagnepain in Bull. Soc. Bot. France LIV. 521 (1908)—Lecomte, Fl. Gén. Indo-Chine, I. 235, fig. 23 (1909).

HAINAN: road from Hoihow, Namfong, and without locality, *W. Y. Chun*, nos. 975, 1007, 1068, February and March, 1920.

This species was previously recorded from Hainan by Gagnepain, as *Flacourtia Balansae* Gagnep., who gives its range as Indochina, Hainan, and the Philippines. My Hainan material presents staminate and pistillate flowers, the latter with 6 styles, and the branches are spiny, some of the ultimate branchlets bearing spines up to 2 cm. in length, the older branches with spines up to 4 cm. long. The distinguishing characters given by Gagnepain as between *Flacourtia sepiaria* Roxb. and *F. Balansae* Gagnep. are apparently not constant, and I have accordingly reduced

the latter species. In any case if a specific name is needed for the form with 6 or 7 styles (*F. Balansae* Gagnep.), other than the above name I have adopted from the younger Burman, then this is supplied by *Myroxylon decline* Blanco (1837) and *Stigmarota edulis* Blanco (1845), for Blanco's species is exactly identical with the form described by Gagnepain. The form with six styles also occurs in the Malay Peninsula and presumably in Java as Koorders and Valeton describe *Flacourtia ramontchi* L'Hér., which I believe also to be a synonym of *F. indica* Merr., as having 4- to 7-merous flowers. *Flacourtia rukam* Z. & M., *F. inermis* Roxb., and *F. jangomas* Steud., all present the same variation in the number of styles as does *F. indica* Merr. I therefore consider the style character to be an inconstant one in *Flacourtia*, and that *F. Balansae* Gagnep. cannot be separated from *F. sepiaria* Roxb.=*F. indica* (Burm. f.) Merr.

MYRTACEAE

Eugenia Micheli

Eugenia multipunctata, sp. nov. (§ *Jambosa*).

Arbor glabra, 8 ad 10 m. alta, ramis ramulisque teretibus, brunneis, ramulis 1 ad 1.5 mm. diametro; foliis oppositis, oblongo-ellipticis ad ellipticis, utrinque angustatis, apice acuminatis, basi subobtusis ad cuneatis, in sicco olivaceis nitidis, subtus pallidioribus et perspicue multipunctatis, chartaceis ad subcoriaceis, 5 ad 9 cm. longis, 2 ad 4.5 cm. latis, nervis utrinque circiter 10 tenuibus obscuris, reticulis obsoletis; petiolo circiter 5 mm. longo; cymis plerisque axillaribus paucifloris 1 ad 3 cm. longis e basi ramosis, ramis paucis; floribus albis, omnibus pedicellatis plerisque 3-meris, 7 ad 8 mm. diametro, pedicellis circiter 3 mm. longis, bracteis lanceolatis acuminatis 1.3 mm. longis; calyce late infundibuliformi basi minute bibracteolato circiter 1.5 mm. longo, sepalis 3, raro 4, orbiculari-ovatis rotundatis 1 mm. longis; petalis 3, raro 4, ellipticis rotundatis circiter 3.5 mm. longis punctato-glandulosis; filamentis numerosis 3 ad 4 mm. longis.

HAINAN: Five Finger Mountains, *W. Y. Chun*, no. 2034 (type), 1567, May and June, 1920, in forests. Chun's no. 2033 probably also belongs here, but I have seen no specimen of this, having merely Mr. A. N. Steward's note on which to base this deduction.

This species is strongly characterized by its conspicuously multipunctate leaves and especially by its 3-merous, rarely 4-merous, flowers, 3-merous flowers being an aberrant character in this large genus.

SYMPLOCACEAE

Symplocos Jacquin

Symplocos Chunii, sp. nov. (§ *Bobua*, *Lodhra*).

Arbor circiter 7 m. alta, inflorescentiis dense ferrugineo-pubescentibus exceptis glabra, ramulis circiter 2 mm. diametro; foliis chartaceis, suboli-

vaceis, subtus paullo pallidioribus, glaberrimis, anguste oblongis ad oblongo-oblanceolatis, 8 ad 10 cm. longis, 2 ad 3 cm. latis, apice acutis, obscure obtuseque acuminatis vel obtusis, deorsum angustatis, basi cuneatis, margine cartilagineis, leviter undulato-crenatis crenulis apiculatis, costa supra leviter impressa, subtus prominula; nervis primariis utrinque 8 ad 10, adscendentibus, tenuibus distinctis obscure arcuato-anastamosantibus; petiolo 6 ad 8 mm. longo; inflorescentiis spicatis, axillaribus et in axillis defoliatis, brevibus densis paucifloris 0.8 ad 1.5 cm. longis, plerumque 4- ad 8-floris, axi bracteolisque dense ferrugineo-pubescentibus; floribus flavidis 10 ad 12 mm. diametro, bracteolis ovatis 2 mm. longis, calyces involucrantibus; calyce glabro, tubo 1.5 mm. longo, lobis 5 patulis ovatis ad oblongo-ovatis obtusis, tubo aequantibus vel paullo brevioribus; petalis ellipticis glabris apice rotundatis circiter 4.5 mm. longis et 2.5 mm. latis; staminibus circiter 70, filamentis glabris, deorsum vix connatis, obscurissime pentadelphis, 3 ad 7 mm. longis; stylis 5 mm. longis, glabris; ovario 3-loculare.

HAINAN: Lotus Range near Nodoa, *W. Y. Chun*, no. 642, January 15, 1920, in ravines along small streams, altitude about 600 m.

A well marked species belonging in the group with *Symplocos garciniifolia* Guillaumin but with smaller leaves which are not slenderly acuminate, their margins obscurely undulate-crenate, although the crenulations are glandular-apiculate. The flowers are larger than in Guillaumin's species, while the calyx-tube is about as long as the lobes. It seems to be equally distinct from other species in this group such as *Symplocos congesta* Benth. and *S. cuspidata* Brand.

Symplocos fasciculiflora, sp. nov. (§ *Bobua, Lodhra*).

Arbor parva, circiter 5 m. alta, bracteolis ferrugineo-pubescentibus exceptis glabra, ramis ramulisque teretibus, ramulis 1.5 ad 2 mm. diametro; foliis in sicco utrinque viridibus opacis chartaceis vel subcoriaceis oblongis ad oblongo-ellipticis, 5 ad 8 cm. longis et 2 ad 3.5 cm. latis, integerrimis, acutis vel abrupte breviterque acuminatis, basi cuneatis, costa supra leviter impressa, subtus valde prominula; nervis primariis utrinque 8 ad 10 tenuibus haud perspicuis; petiolo circiter 1 cm. longo; inflorescentiis axillaribus paucifloris fasciculatis in ramulis ultimis dispositis; floribus albis sessilibus 5-meris 6 ad 8 mm. diametro bracteolatis, bracteolis 3 late ovatis circiter 1 mm. diametro, ferrugineo-pubescentibus; calyce glabro, tubo circiter 1 mm. longo, lobis late ovatis rotundatis tubo subaequantibus; petalis oblongo-ellipticis rotundatis 3 mm. longis, basi leviter connatis; staminibus circiter 30, filamentis glabris liberis 2 ad 4 mm. longis; stylis crassis glabris 4 mm. longis, sursum incrassatis, distincte clavatis.

HAINAN: northwest slope of Five Finger Mountains, *W. Y. Chun*, no. 1873, June 4, 1920, in forests, altitude indicated as 1800 m. which is probably too high.

A species in the general group with *Symplocos cuspidata* Brand and *S.*

congesta Benth., from both of which it is at once distinguished by its much fewer stamens.

RUBIACEAE

Litosanthes Blume

Litosanthes biflora Blume, Cat. Gew. Buitenzorg, 21 (1823).—Merrill, Enum. Philip. Pl. III. 568 (1923).

Lasianthus gracilis King & Gamble in Jour. As. Soc. Bengal, LXXIII. pt. II. 132 (Mat. Fl. Malay. Penin. IV. 206) (1904).

HAINAN: Five Finger Mountains, *F. A. McClure*, no. 8708, on forested slopes, altitude 700 m.

Malay Peninsula, Java, and the Philippines (Luzon, Mindoro, Catanduanes, Leyte, Negros, Mindanao). The genus is new to China.

FURTHER NOTES ON CHINESE LIGNEOUS PLANTS.[1]

H. H. HU.

Alnus Jackii, sp. nov.

Arbor ad 10 m. alta, cortice cinereo; ramuli glabri, lenticellati. Folia elliptica, ovata vel elliptico-obovata, 4–7.5 cm. longa et 2.2–3 cm. lata, apice acuta vel cuspidata, basi subrotundata vel rarius late cuneata, glanduloso-serrata, utrinque intense viridia, subtus ad costam et sparsissime ad venas rectas utrinque circiter 10 puberula, ceterum glabra; petioli graciles, ad 2 cm. longi: inflorescentia mascula ex amentis 5–6 cylindricis autumno circiter 2 cm. longis composita, resinosa, pedunculis erectis 8 mm. longis. Strobili solitarii, erecti, pedunculo circiter 1 cm. longo sustenti, ovoidei vel ellipsoidei, circiter 2 cm. longi et 1.2 cm. diam.; bracteae apice truncatae, breviter lobulatae, circiter 5 mm. longae et 7 mm. latae; semina orbicularia, compressa, circiter 3.5 mm. longa et lata, apice acutiuscula, margine coriaceo angusto, nitida, castanea.

Ab affini *A. formosana* Makino praecipue differt foliorum forma et strobilis solitariis.

CHEKIANG: Tien-tai-shan, *Ren-Chang Ching*, no. 2606 (type), Dec. 10, 1924, and no. 1514, May 9, 1924. FOKIEN: Siu-Ning-sien, *Ren-Chang Ching*, no. 2295, Aug. 5, 1924.

Meratia yunnanensis, comb. nov.

Chimonanthus yunnanensis W. W. Smith in Notes Bot. Gard. Edinb. VIII. 182 (1914).

As Rehder and Wilson remarked in Plantae Wilsonianae, I. 419 (1913) that Meratia Loiseleur was published one year before Chimonanthus Lindley, we have to accept Loiseleur's name for this genus. Accepting Rehder and Wilson's statement this new combination is made.

Deutzia Chunii, sp. nov.

Ramuli graciles, sparse stellato-pilosi. Folia oblongo-lanceolata, 3–5.5

[1] See Vol. V. 227 of this Journal for preceding Notes.

cm. longa et 1.2–1.8 cm. lata, acuminata, basi late cuneata, remote minuteque serrulata, pube stellato-pilosa dimorpha, supra viridia scabrida, pilis 4–5-radiatis sparsius instructa, subtus albida, dense pilis 10–12-radiatis obtecta; petioli 3–4 mm. longi, stellato-pilosi. Paniculae ad 10 cm. longae, multiflorae, stellato-pilosae; pedicelli graciles, 1–1.5 mm. longi; calyx stellato-pilosus, dentibus triangulari-ovatis acutiusculis tubo aequilongis; petala ovato-oblonga, 6 mm. longa et 2.5 mm. lata, alba; stamina petalis aequilonga vel breviora, filamentis edentatis; styli 3, staminibus aequilongi, stigmatibus capitatis bilobis. Fructus deest.

Affinis *D. Schneiderianae* Rehd., sed foliis angustioribus minus scabris et floribus minoribus differt.

Chekiang: without precise locality, *Ren-Chang Ching*, no. 4750 (type), 1924.

Itea longibrateata, sp. nov.

Frutex circiter 60 cm. altus, glaber. Folia coriacea, ovato-oblonga, circiter 7.5 cm. longa et 3 cm. lata, acuminata vel acuta, basi rotundata, remotius serrata, supra nitida viridia, subtus pallidiora, glabra; petioli ad 1 cm. longi. Racemi axillares et terminales, ad 6 cm. longi, satis dense multiflori; pedunculus puberulus; flores albi, breviter pedicellati vel subsessiles, circiter 2 mm. diam.; bracteae anguste lanceolatae, ad 8 mm. longae et 1 mm. latae, acuminatae, minute serrulatae; calyx hirtellus, lobis lineari-lanceolatis, quam petala brevioribus; petala ovata, circiter 1.5 mm. longa; antheris subsessilibus ovali-oblongis inclusis; styli 2-connati, stigmatibus capitatis: ovarium 2-loculare, semi-inferius. Fructus deest.

Ab affini *I. ilicifolia* Oliv. racemis brevioribus, bracteis longioribus lanceolatis serrulatis, floribus multo minoribus subsessilibus, staminibus inclusis differt.

Chekiang: Yun-Fan, Taichow, on rocky summit, 2000 ft. altitude, *Ren-Chang Ching*, no. 1316 (type), May 1, 1924.

Rubus Chungii, sp. nov.

Frutex sarmentosus scandens, ad 1.2 m. altus; rami graciles teretes, cortice rubro-brunneo vestiti, sparse aculeis compressis basi dilatatis leviter recurvis vel rarius rectis ad 5 mm. longis armati. Folia ambitu rotundata, 4.5–7 cm. diam., palmatim ultra medium 5- vel rarius 3-loba, sinubus obtusis vel rotundatis, lobis dupliciter serratis, medio rhombico-ovato longe acuminato saepe basi subito constricto ad 4.5 cm. longo et 2.5 cm. lato, lateralibus inaequilateralibus, basilibus multo minoribus vel deficientibus; petioli graciles, circiter 2.5 cm. longi, interdum aciculis minutis armati. Flores axillares, solitarii, pedunculo gracili ad 3 cm. longo suffulti; calyx virescens vel purpurascens, extus intusque sericeo-villosulus, extus demum glabrescens, lobis ovato-oblongis acuminulatis 7 mm. longis et basi 4 mm. latis; petali ignoti. Fructus subglobosus, circiter 1.5 cm. diam., ruber; semina compressa, 2 mm. longa et 1.5 mm. lata.

Ab affini *R. palmato* Thunb. qui folii ambitu ovatis, sinubus acutis et lobo medio basin versus plus minusve lobulato gaudet, foliis ambitu rotundatis, sinubus rotundatis vel obtusis, lobis non lobulatis distinctus.

CHEKIANG: Yun-Fan, Taichow, in shaded woods, 200 ft. altitude, *Ren-Chang Ching*, no. 1329 (type), May 1, 1924; without precise locality, no. 4768, 1924.

Fagara multijuga, comb. nov.

Zanthoxylum multijugum Franchet, Pl. Delavay. 124 (1889).
Zanthoxylum multifoliolatum Hemsley in Hooker's Icon. XXVI. t. 2595 (1899).
Fagara mengtzeana Hu in Jour. Arnold Arb. v. 228 (1924).

I at first overlooked that *Zanthoxylum multifoliolatum* Hemsley is synonymous with *Z. multijuga* Franchet. Hence this new combination.

Xanthophyllum hainanense, sp. nov.

Xanthophyllum racemosum G. W. Groff, Ding & E. H. Groff in Lingnaam Agric. Review, I. no. 1. 26 (1924), quoad plantam e Hainan.—Non Chodat.[1]

Arbor 10–12 m. alta, trunco 20 cm. diam.; ramuli graciles, glabri, teretes. Folia ovato-elliptica, ad 10 cm. longa et 3 cm. lata, in acumen caudatum ad 2 cm. longum sensim attenuata, basi late cuneata, integra, leviter undulata, supra lucida, leviter reticulata, costa satis distincte elevata, subtus opaca, costa valde elevata, minute reticulata, glabra; petiolus supra canaliculatus, circiter 1 cm. longus. Racemi axillares, pedunculo incluso ad 10 cm. longi dissitiflori; pedicelli ut pedunculus minute puberuli, 8 mm. longi; flores ignoti. Fructus immaturus globosus, minute puberulous.

Affinis *X. racemoso* Chodat a quo costa supra elevata, acumine foliorum basi lato et fructo juvenili puberulo, nec villoso, differt.

HAINAN: South slope of Five Finger Mt., *F. A. McClure*, no. 9421 (type), May 4, 1922; no. 9440, May 5, 1922; wooded ravine; tree; ht., 10–12 m.; dia., 20 cm.; frs., green.

Berchemiella crenulata, comb. nov.

Chaydaia crenulata Handel-Mazzetti in Akad. Anz. Akad. Wiss. Wien, 1921, no. 18 (Pl. Nov. Sin. cont. 12, p. 5) (1921).

The genus Berchemiella was separated from Chaydaia Pitard by T. Nakai in Bot. Mag. Tokyo, XXXVII. 31 (1923). It differs from Chaydaia in having a paniculate to fasciculate-racemose inflorescence, turgid disk embracing half of the ovary and a deciduous style-base. From Handel-Mazzetti's description the above species is a Berchemiella and not a Chaydaia according to Nakai's definition. Hence the new combination.

Vitis fagifolia, sp. nov.

Frutex scandens, ad 3 m. altus; rami suberecti, graciles, initio dense rufo-tomentosi, demum sparse cinereo-tomentelli; cirrhi satis robusti. Folia subsessilia, oblongo-elliptica, ad 6.5 cm. longa et 3 cm. lata, acuta vel breviter acuminata, basi oblique rotundata vel subrotundata, repando-serrata dentibus mucronulatis, ciliata, supra glabra, subtus cinereo-puberula et ad venas rufo-pubescentia. Inflorescentia paniculata, multi-

[1] *Xanthophyllum racemosum* Chodat see Merrill in Jour. Arnold Arb. VI. 134 (1925).

flora, ad 4 cm. longa, rhachide rufo-tomentella; pedicelli filiformes, ad apicem leviter incrassati, 3.5 mm. longi; flores luteo-virides, fragrantes; stamina 2.5 cm. longa, filamentis gracilibus, antheris globis pallide luteis; stigma brunneum. Fructus ignotus.

Species foliis subsessilibus ab omnibus aliis speciebus generis distincissima.

CHEKIANG: Taichow, on exposed grassy foothill, 30 ft. altitude, *Ren-Chang Ching*, no. 1297 (type), April 30, 1924; Changhua, on rocky slopes, 900 ft. altitude, *F. N. Meyer*, no. 1548, July 12, 1915.

Meyer's is a sterile specimen which has leaves up to 11 cm. long and 6.5 cm. broad, evidently coming from a vigorous young shoot.

Vitis chunganensis, sp. nov.

Frutex scandens, ad 1.5 cm. altus; rami graciles, subflexuosi, glabri; cirrhi satis robusti. Folia cordato-ovata vel cordato-subdeltoidea ad 14 cm. longa et 9 cm. lata, breviter acuminata, sinu basali lato et profundo, lateribus rotundatis, ad basin serrata dentibus valde remotis calloso-mucronulatis, utrinque glabra, supra lucide viridia, subtus albido-glauca, magis reticulata supra quam infra; petioli ad 6 cm. longi, rubro-brunnei. Inflorescentia paniculata, laxa, ad 13 cm. longa, sine cirrhis, rhachide glabra; pedicelli satis robusti; baccae immaturae globosae, circiter 8 mm. diam.

Affinis *V. flexuosae* Thunb. sed foliis majoribus subtus glaucis distincta.

FOKIEN: Chung-An Sien, *H. H. Hu*, no. 1348 (type), September 27, 1921; without precise locality, *S. T. Dunn*, no. 2504, April to June, 1905. Dunn's specimen is with very young fruits.

Metaplexis sinensis, comb. nov.

Holostemma sinense Hemsley in Jour. Linn. Soc. XXVI. 103 (1889).
Metaplexis Hemsleyana Oliver in Hooker's Icon. Pl. XX. t. 1970 (1891).

Apparently C. Schneider overlooked Oliver's name when he gave a supplementary description of this species in Plantae Wilsonianae, III. 344 (1916), as he did not cite Oliver's name as a synonym. He also said: "I doubt if our plant belongs to Holostemma at all. . . . Since Oliver made it clear that this species is closely related to *Metaplexis Stauntoni*, the position of this species seems settled. Since Oliver did not make a correct combination, I take this chance to propose it.

Tabernaemontana pallida, comb. nov.

Ervatamia pallida Pierre in Spire, Caoutch. Indo-Chine, 141 (1906).

Otto Stapf in Thiselton-Dyer, Flora of Tropical Africa, 126 (1902) raised the section Ervatamia of Tabernaemontana to generic rank, but E. D. Merrill in his various writing did not take up this new genus. I also think the difference is not pronounced, and it is better to reduce Ervatamia to a section again. Hence the new combination for this species.

TWO NEW TREES FROM CHEKIANG

WOON YOUNG CHUN.

Torreya Jackii, sp. nov.

Arbor parva ad 8 vel 12 m. alta, trunco circiter 20 cm. diam., vel saepius frutex altus ramosissimus, fructificans aetate juvenili; rami ascendentes ramulis patentibus vel leviter pendulis, comam irregularem vel rotundatam formantes; cortex trunci cinereus, leviter fibrosus, in lamellas tenues irregulares decorticans et corticem interiorem brunnescentem detegens; ramuli hornotini virides, demum viridi-brunnei, anno secundo et tertio rubro-brunnei, lucidi, vetustiores obscure grisei. Folia biseriatim expansa, leviter porrecta, falcata, linearia, 3.5–9, pleraque 6–8 cm. longa et 3–4 mm. lata, sensim in apicem spinosum attenuata, basi leviter torta, margine in sicco non revoluta, supra intense et lucide viridia, costa media inconspicua leviter impressa, subtus luteo-viridia et striis stomatiferis 2 albescentibus notata, fracta odore aromatico. Flores non visi. Fructus (immaturus) circiter 2 cm. longus, obovoideus, virescens, pruinosus, subsessilis, basi squamis pluribus castaneis lucidis suffultus; endospermum, ut videtur, profunde ruminatum.

Proxima *T. californicae* Torrey (*Tumion californicum* [Torrey] Greene) quae foliis brevioribus non falcatis, fructo ovoideo vel oblong-ovoideo differt.

CHEKIANG: Ga Fung Kwan, Chen Chon, 20 li south of Hsien-Chü Hsien alt. 400–900 m., *Ren-Chang Ching*, June 3, 1924, Southeastern University expedition to Chekiang, no. 1779 (type); tree in fruit, locally abundant but not reported elsewhere. Specimens in the Herbarium of the National Southeastern University, Nanking, China, and in the Herbarium of the Arnold Arboretum.

The leaves of this species are very aromatic when bruised or burned, giving off a fragrance like that of sandalwood oil. The wood is fairly hard and very fragrant.

This species is named in honor of Professor John G. Jack of the Arnold Arboretum, teacher of the author, and of other Chinese students of taxonomic botany, in order to record our sense of gratitude to him for the part he played in initiating and encouraging the systematic study of Chinese plants by the Chinese themselves.

Halesia Macgregorei, sp. nov.

Arbor mediocris ad 24 m. alta, maturitate glaberrima perulis ciliatis et dorso sparse stellato-pubescentibus exceptis; trunci cortex laevis, cinereus; ramuli graciles, purpureo-fusci, glabri, annotini obscure cinerei; gemmae juveniles anguste conicae, perulis lucidis brunneis, interioribus plus minusve stellato-pubescentibus. Folia decidua, tenuiter membranacea, breviter petiolata, magnitudine et forma variabilia, pleraque elliptico-oblonga, interdum anguste elliptica vel ova-toelliptica, 3.5–8.5 cm. longa et 1.8–3 cm. lata, acuminata vel cuspidato-acuminata, basi pleraque cuneata,

rarius subrotundata, denticulata denticulis glanduloso-mucronatis, supra laete viridia, costa impressa, venis lateralibus gracilibus, minute reticulata, subtus pallida, juvenilia saepe rubescentia; petioli 6–10 mm. longi. Flores non visi. Fructus solitarii vel 2–3 fasciculati e gemmis aphyllis ramulorum annotinorum, pedunculis 8–12 mm. longis, oblongo-elliptici ad late obovati vel suborbiculares, 2.5–3.5 cm. longi et 1.8–2.5 cm. lati, basi cuneati vel abrupte cuneati vel rotundati, alis 4 initio carnosis et lutescentibus, maturitate siccis et roseo-luteis, apice stylo partim persistenti et calycis vestigiis coronati; putamen anguste cylindricum, costis 4 applanatis cum alis alternantibus, plerumque abortu monospermum.

Affinis *H. carolinae* L. (*Mohrodendron carolinum* Britt.) quae foliis plerisque latioribus stellato-pubescentibus et fructu plerumque obovoideo differt.

CHEKIANG: Di-ping, northeast of Tai-Shun Hsien, alt. 790 m., *Ren-Chang Ching*, July 18, 1924, Southeastern Expedition to Chekiang, no. 2132 (type); tree to 16 m. tall, in open thickets, leaves thicker; Mow Shan, west of Lung-sien, alt. 1280 m., August 24, 1924, same collector and same expedition, no. 2466; trees to 24 m. tall, 45 cm. in diameter, in shade, leaves very thin, larger, to 13 cm. long and 4.5 cm. wide, oblong-lanceolate to elliptic-oblong; fruit obovoid. Specimens of both numbers in the Herbarium of Southeastern University, Nanking and the Herbarium of the Arnold Arboretum.

This species is named in compliment to Mr. Donald MacGregor, Superintendent of Parks, Shanghai, who, in the course of over twenty years' unceasing effort, has introduced numerous valuable plants, both foreign and native, to the enrichment of Chinese gardens.

The discovery of a species of Halesia in China makes another addition to the list of genera once thought to be endemic in America, but subsequently also found to be indigenous in China. Some of the genera of woody plants formerly considered purely North American now known to be common to the two countries are: Hicoria, Liriodendron, Sassafras, Nyssa, Symphoricarpos and Halesia.

TWO NEW GENERA OF BAMBUSACEAE, WITH SPECIAL REMARKS ON THE RELATED GENERA GROWING IN EASTERN ASIA

T. NAKAI

Pleioblastus[1], gen. nov.

Arundinaria Munro in Trans. Linn. Soc. XXVI. 13 (1868), pro parte.—K. Koch Dendr. II. pt. 2, 375 (1873), pro parte.—Bentham & Hooker, Gen. Pl. III. 1207 (1883), pro parte—Hackel in Engler & Prantl, Nat. Pflanzenfam. II. abt. 2, 93 (1899), pro parte.—Camus, Bamb. 26 (1913), pro parte.—Non Michaux.

[1]Etymology: πλειος, more, βλαστος, bud, referring to the associated buds at the nodes.

Sympodialis pleuranthus. Nodi infimi 3–7 ramorum cum internodis nullis vel subnullis congestissimi, et quisque nodus gemmam unicam portans, ita nodi culmorum 3- seu 5- seu 7-gemmati esse videntur. Vagina foliorum persistens, ita nodi culmorum vetustorum saepe ob vaginas emortuas fibrosi; lamina foliorum tessellata; setae orales[1] laevissimae candidae flexuosae subpersistentes. Apiculae semel racemosae; rachis sub floribus articulata; spiculae basi glumis vacuis 2 instructae; gluma fertilis exterior falcato-convoluta subcoriacea tessellata; interior dorso bicarinato-sulcata haud tessellata; paleae 3, una glumam interiorem opposita quam ceteris fere duplo longior; stamina 3, filamenta linearia, antherae subulatae basi sagittatae, flavae, 2-loculares lima laterali fere totam longitudinem aperta, connectivo non producto; Stylus 1, stigmata 3 sub-plumosa erecta. Caryopsis oblonga edulis.

Species 7 in Japonia et in China indigenae.

1. **Pleioblastus communis** Nakai, comb. nov.
Arundinaria communis Makino in Tokyo Bot. Mag. XXVIII. 293 (1914).
HONDO.

2. **Pleioblastus gramineus** Nakai, comb. nov.
Arundinaria Hindsii var. *graminea* Bean in Gard. Chron. ser. 3, XV. 238 (1894).—Makino in Tokyo Bot. Mag. XIV (63) (1900).—Matsumura, Ind. Pl. Jap. II. pt. 1, 88 (1905).—Makino & Shirasawa, Icon. t. 5, fig. 1–3 (1912).—Nohl in Mitt. Deutsch. Dendr. Ges. XXIV. 100 (1915).
Arundinaria graminea Makino in Tokyo Bot. Mag. XXVI. 18 (1912).
CHINA.

3. **Pleioblastus Hindsii** Nakai,comb. nov.
Arundinaria Hindsii Munro in Trans. Linn. Soc. XXVI. 31 (1870).—Makino in Tokyo Bot. Mag. XIV. (63) (1900).—Matsumura, Ind. Pl. Jap. II. pt. 1, 88 (1905).—Makino & Shirasawa, Icon. t. 5, fig. 4–6 (1912).—Nohl in Mitt. Deutsch. Dendr. Ges. XXIV. 100 (1915).
CHINA.

This Bamboo was once an essential element of Japanese garden shrubs. But it began to flower from 1905, and within 10 years it disappeared entirely from the gardens. In those days it fruited well. Some have succeeded in raising seedlings; these, therefore, may exist in Japan, but I do not know where they are at present.

4. **Pleioblastus linearis** Nakai, comb. nov.
Arundinaria linearis Hackel in Bull. Herb. Boiss. VII. 721 (1899).
LIUKIU.

5. **Pleioblastus Matsunoi** Nakai, comb. nov.
Arundinaria Matsunoi Makino in Journ. Jap. Bot. II. 8 (1918).
HONDO: in collibus Yokohama.

6. **Pleioblastus Maximowiczii** Nakai, comb. nov.
Arundinaria Maximowiczii Hort. apud A. & C. Riviere in Bull. Soc. Accl. sér. 3, v. 783 (1878).—Camus, Bamb. 34, t. 17, fig. A. (1913).

[1] Setae orales applies to the bristles at the upper edge of the sheath of leaves growing like a stipule.

Bambusa Chino Franchet & Savatier, Enum. Pl. Jap. II. pt. 1, 183 (1876), nom. nud.; pt. 2, 607 (1879).
Arundinaria japonica Franchet & Savatier, l. c. 182, pro parte, quoad specim. Savatier no. 1492.—Non Sieb. & Zucc.
Arundinaria Laydekeri Bean in Gard. Chron. sér. 3, XV. 368 (1894).
Bambusa Laydekeri Hort. apud Satow in Trans. Asiat. Soc. Jap. XXVII. 47 (1899).
Arundinaria Simoni var. *Chino* Makino in Tokyo Bot. Mag. XIV. (62) & 98 (1900).—Matsumura, Ind. Pl. Jap. II. pt. 1. 89 (1905).—Makino & Shirasawa, Icon. t. 5, fig. 7–14 (1912).
Arundinaria Chino Makino in Tokyo Bot. Mag. XXVI. 14 (1912).
HONDO.

Pleioblastus Maximowiczii var. **argenteo-striatus** Nakai, comb. nov.
Arundinaria Simoni var. *argenteo-striata* Makino in Tokyo Bot. Mag. XIV (62), 100 (1900).—Matsumura, Ind. Pl. Jap. II. pt. 1, 89 (1905).—Makino & Shirasawa, Icon. t. 8, fig. 9–17 (1912).
Arundinaria Chino var. *argenteo-striata* Makino in Tokyo Bot. Mag. XXVI. 14 (1912).
JAPONIA: in hortis.

7. **Pleioblastus Simoni** Nakai, comb. nov.
Bambusa Metake Zollinger, Syst. Verz. I. 57 (1854), nom. nud.—Non Siebold.
Arundinaria japonica A. Gray in Mem. Am. Acad. Sci., new ser. VI. 328 (1859), pro parte.—Matsumura, Shokubutsu-meii, 32 (1895).—Sataw in Trans. Asiat. Soc. Jap. XXVII. 43 (1899).—Non Sieb. & Zucc.
Bambusa Simoni Carrière in Rev. Hort. 1876, 359.
Arundinaria Fortunei Fenzi in Gard. Chron. n. ser. VI. 773 (1876).—Non Rivière.
Arundinaria Simoni A. & C. Rivière in Bull. Soc. Accl. sér. 3, v. 774, fig. 43–50 (1878).—Bean in Gard. Chron. ser. 3, XV. 368 (1894).—Mitford, Bamb. Gard. 59 (1896).—Makino in Tokyo Bot. Mag. XIV. 62, 95 (1900).—Matsumura, Ind. II. pt. 1, 89 (1905).—J. Houzon in Mitt. Deutsch. Dendr. Ges. XVI. 226 (1907).—Makino & Shirasawa, Icon. t. 7, fig. 1–5 (1912).—Camus, Bamb. 33, t. 17, fig. B. (1913).—Nohl in Mitt. Deutsch. Dendr. Ges. XXIV. 100 (1915).
Arundinaria vaginata Hackel in Bull. Herb. Boiss. VII. 717 (1899).
JAPONIA: in Hondo, Shikoku, Kiusiu et Ins. Tsushima.

In the southeastern end of Korean peninsula between Basan and Hokô this species is planted to make hedges. The history of introduction in unknown. Faurie's no. 1203 is a fruiting specimen collected at Fusan. Two varieties exist in Japanese gardens.

Pleioblastus Simoni var. **variegatus** Nakai, comb. nov.
Arundinaria Simoni var. *variegata* Hooker fil. in Bot. Mag. CXVI. t. 7146 (1890), styli male delineati.—Makino in Tokyo Bot. Mag. XIV. 97 (1900).—Matsumura, Ind. Pl. Jap. II. pt. 1, 90 (1905).—Nohl in Mitt. Deutsch. Dendr. Ges. XXIV. 100 (1915).
Arundinaria Simoni var. *albo-striata* Bean in Gard. Chron. ser. 3, XV. 301 (1894).
Arundinaria Simoni var. *striata* Mitford, Bamb. Gard. 59 (1896).
Arundinaria Simoni Hackel in Bull. Herb. Boiss. VII. 716 (1899).—Non Rivière.

Pleioblastus Simoni var. **heterophyllus**, Nakai, comb. nov.
Arundinaria Simoni var. *heterophylla* Makino apud Makino & Shirasawa, Icon. t. 8, fig. 18–24 (1912).

Indocalamus,[1] gen. nov.

Sympodialis pleuranthus. Nodi ramorum distantes ita ramuli distantes et gemma solitaria. Vaginae foliorum persistentes; folia tessellata; setae orales e processu calloso evolutae, scabrae vel parce setulosae, fuscescentes vel fere albidae. Spiculae in apice rami foliati vel efoliati terminales paniculatae; panicula bracteata vel ebracteata; rachis sub flores articulata; spiculae basi glumis vacuis binis instructa; gluma fertilis exterior falcato-convoluta, subcoriacea, tessellata vel fere non tessellata, interior dorso bicarinato-sulcate; paleae 3 subaequales; stamina 3, antheris saepe coloratis; stylus 1, stigmata 2 arcuata plumosa.

Species 7 in Zeylania, India orient., China, Philippin. et Formosa indigenae.

This genus is very much like Sasa, but differs in the numbers of stamens and stigmas.

1. **Indocalamus Fargesii** Nakai, comb. nov.
Arundinaria Fargesii E. G. Camus in Lecomte, Not. Syst. II. 244 (1911).
CHINA.

2. **Indocalamus floribundus** Nakai, comb. nov.
Arundinaria floribunda Thwaites, Enum. Zeyl. Pl. 375 (1864).—Munro in Trans. Linn. Soc. XXVI. 20 (1868).—Gamble, Ind. Bamb. 5, t. 3 (1896); in Hooker, Fl. Brit. Ind. VII. 377 (1897).—Camus, Bamb. 28, t. 16, fig. B (1913).
ZEYLANIA.

3. **Indocalamus niitakayamensis** Nakai, comb. nov.
Arundinaria niitakayamensis Hayata in Tokyo Bot. Mag. XXI. 49 (1907); in Jour. Coll. Sci. Tokyo, XXV. 240 (1908).—Gamble in Philip. Jour. Sci. Bot. V. 267 (1910).—Merrill, Enum. Philip. Flow. Pl. I. fasc. 1. 94 (1922).
Bambusa aff. B. pygmaea apud Merrill in Philip. Jour. Sci. Bot. II. 261 (1907).
Sasa niitakayamensis Camus, Bamb. 24 (1913).
Sasa niitakayamensis var. *microcarpa* Camus, l. c.
FORMOSA ET PHILIPPIN.

4. **Indocalamus rigidulus** Nakai, comb. nov.
Arundinaria rigidula E. G. Camus in Lecomte, Not. Syst. II. 243 (1911).
CHINA.

5. **Indocalamus sinicus** Nakai, comb. nov.
Arundinaria sinica Hance in Ann. Sci. Nat. sér. 4, XVIII. 235 (1862); in Jour. Linn. Soc. XIII. 137 (1873).—Rendle in Jour. Linn. Soc. XXXVI. 436 (1904).
Arundinaria longiramea Munro in Trans. Linn. Soc. XXVI. 19 (1868).
Arundinaria Wightii Nees apud Bentham, Fl. Hong. 434 (1861).
Arundinaria sinicica [*sic*] Hance apud Camus, Bamb. 47 (1913).
HONGKONG.

6. **Indocalamus Walkerianus** Nakai, comb. nov.
Arundinaria Walkeriana Munro in Trans. Linn. Soc. XXVI. 21 (1868).—Gamble, Bamb. Ind. 3, t. 1 (1896).—Trimen, Handb. Fl. Ceyl. V. 310 (1900).—Camus, Bamb. 27 (1913).
ZEYLANIA.

[1] Etymology: Indo, of India, a country extending from the East Indies to China, and calamus, reed.

7. **Indocalamus Wightianus** Nakai, comb. nov.

Arundinaria Wightiana Nees in Linnaea, IX. 482 (1834).—Ruprecht, Bamb. 26, t. 3, fig. 10 (1839).—Steudel, Syn. Gram. 335 (1855).—Thwaites, Enum. Zeyl. Pl. 444 (1864).—Munro in Trans. Linn. Soc. XXVI. 19 (1868).—Gamble, Bamb. Ind. 4, t. 2 (1896); in Hooker, Fl. Brit. Ind. VII. 377 (1897).—Camus, Bamb. 28, t. 22, f. B (1913).

INDIA ET ZEYLANIA.

Indocalamus Wightianus var. **hispidus** Nakai, comb. nov.

Arundinaria hispida Steudel, Syn. Gram. 335 (1855).

Arundinaria Wightiana var. β *hispida* Gamble, Bamb. Ind. 4 (1896); in Hooker, Fl. Brit. Ind. VII. 377 (1897).

Arundinaria moliniformis Hochstetter in herb. Hohenacker n. 1282 apud Gamble, l. c.

INDIA.

Widely different types were described hitherto under *Arundinaria*, so that the genus became unreasonably large and complicated. The true *Arundinaria* grows in North America and Asia. These are *Arundinaria macrosperma* Michaux (type), *A. tecta* Muhlenberg, *A. maling* Gamble, *A. Wilsonii* Rendle, *A. Faberi* Rendle. The latter three species have more branched culms and may represent a distinct section. *Arundinaria hirsuta* Munro and *A. Rolloana* Gamble are probably species of this genus but without flowers we can not determine their exact position. These species have the oral setae (setae orales, v. s.) rigid and scabrous somewhat brownish and radiating from a common thick process of the edge of the sheath. They drop with that process from the sheath by articulation. The species of *Phyllostachys* and *Sasa* have this kind of setae. The nature of setae is an important generic character in classifying Bamboos. It is as important as the form of pappus in *Compositae*.

Mr. Makino who studied the Japanese Bamboos very carefully has cleverly separated *Pseudosasa*, *Chimonobambusa*, *Semiarundinaria* and *Sinobambusa* from *Arundinaria*, though he has not given any descriptions, but there are sufficient reasons for distinguishing these genera. The group of *Arundinaria* has tessellate leaves as has the *Phyllostachys* group and includes the following genera besides the two genera described above.

1. Sasa Makino & Shibata

Vaginae culmorum appendiculatae vel inappendiculatae, persistentes; gemma solitaria; setae orales scabrae rigidae vel rarius non evolutae. Inflorescentia paniculata, glumae tessellatae, exteriores saepe aristato-acuminatae; stamina 6; stylus 1; stigmata 3, subplumosa.

1. **Sasa bitchuensis** Makino in Tokyo Bot. Mag. XXVIII. 31 (1914).
2. **S. chartacea** Makino & Shibata in Tokyo Bot. Mag. XV. 27 (1901).
3. **S. kurilensis** Makino & Shibata, l. c.
4. **S. nana** Makino in Tokyo Bot. Mag. XXVI. 13 (1912).
5. **S. purpurascens** Camus, Bamb. 19, t. 1, fig. B (1913).
6. **S. nipponica** Makino & Shibata in Tokyo Bot. Mag. XV. 24 (1901).

7. **S. ramosa** Makino & Shibata, l. c.
8. **Sasa senanensis** Rehder in Jour. Arnold Arb. I. 58 (1919).
9. **S. Shimidzuana** Makino in Jour. Jap. Bot. II. 4. 15 (1920).
10. **S. stenantha** Nakai, comb. nov.
    S. senanensis var. *ontakensis* Franchet & Savatier, Enum. Pl. Jap. II. 606 (1879).
    Bambusa stenantha Makino in Tokyo Bot. Mag. XIV. (62) (1900).
11. **S. tessellata** Makino & Shibata in Tokyo Bot. Mag. XV. 27 (1901).
12. **S. Tokugawana** Makino in Jour. Jap. Bot. I. 2, 6 (1916).
13. **S. Tsuboiana** Makino in Tokyo Bot. Mag. XXVI. 23 (1912).
14. **S. Veitchii** Rehder in Jour. Arnold Arb. I. 58 (1919).

II. Pseudosasa Makino

Vaginae culmorum fere inappendiculatae, persistentes; gemma solitaria; setae orales laeves. Spiculae corymboso-ramosae; glumae tessellatae, exteriores ariatatae; stamina 3 (4); stylus 1; stigmata 3, plumosa.

1. **Pseudosasa japonica** Makino in Jour. Jap. Bot. II. 4, 15 (1920).
   Arundinaria japonica Siebold & Zuccarini ex Steudel, Syn. Gram. 334 (1855).

2. **Pseudosasa Owatarii** Makino in Jour. Jap. Bot. II. 4, 16 (1920).
   Arundinaria Owatarii Makino in Tokyo Bot. Mag. XXI. 16 (1907).

3. **Pseudosasa variegata** Nakai, comb. nov.
   Bambusa variegata Siebold apud Miquel in Ann. Mus. Bot. Lugd.-Bat. II. 285 (Prol. 173) (1866).

4. **Pseudosasa disticha** Nakai, comb. nov.
   Bambusa disticha Mitford, Bamb. Gard. 183 (1896).

III. Arundinaria Michaux

Vaginae culmorum appendiculatae persistentes; gemmae solitariae sed demum ramuli in nodis saepe congesti; setae orales scabrae rigidae. Spiculae divaricato-racemosae; glumae indistincte tessellatae, exterior subaristata; stamina 3; stylus 1; stigmata 3, subplumosa.

1. **Arundinaria macrosperma** Michaux, Fl. Bor.-Amer. I. 74 (1803).
2. **Arundinaria tecta** Muhlenberg, Descrip. uber. Gram. Am. Sept. 191 (1817).
3. **Arundinaria Faberi** Rendle in Jour. Linn. Soc. XXXVI. 435 (1904).
4. **Arundinaria Maling** Gamble apud Camus, Monog. Bamb. 31, t. 16, fig. A (1913).
5. **Arundinaria Wilsonii** Rendle in Jour. Linn. Soc. XXXVI. 437 (1904).

IV. Semiarundinaria Makino

Vaginae culmorum appendiculatae, deciduae vel puncto dorsali subpersistentes; gemmae plures; setae orales laeves rigidae. Spiculae race-

moso-ramosae vel paniculatae; glumae coriaceae, tessellatae, sed inconspicuae; stamina 3; stylus 1; stigmata 3, ciliata.

1. **Semiarundinaria fastuosa** Makino in Jour. Jap. Bot. II. 8 (1918).
Bambusa fastosa Mitford, Bamb. Gard. 105 (1896).
Arundinaria Narihira Makino in Tokyo Bot. Mag. XIV. (63) (1900), cum var.

2. **Semiarundinaria sat** Nakai, comb. nov.
Arundinaria Sat Balansa in Jour. de Bot. IV. 28 (1890).

3. **Semiarundinaria Pantlingii** Nakai, comb. nov.
Arundinaria Pantlingii Gamble, Ind. Bamb. 129, t. 118 (1896).

V. Chimonobambusa Makino

Vaginae culmorum fere inappendiculatae, deciduae; gemmae plures; setae orales laeves. Spiculae racemosae; glumae non tessellatae longitudine elevato-nervosa; stamina 3; styli 2; stigmata ciliata.

1. **C. baviensis** Nakai, comb. nov.
Arundinaria baviensis Balansa in Morot, Jour. de Bot. IV. 28 (1890).

2. **C. callosa** Nakai, comb. nov.
Arundinaria callosa Munro in Trans. Linn. Soc. XXVI. 30 (1868).

3. **C. densifolia** Nakai, comb. nov.
Arundinaria densifolia Munro, l. c. 32.

4. **C. falcata** Nakai, comb. nov.
Arundinaria falcata Nees in Linnaea, IX. 478 (1834).

5. **C. Griffithiana** Nakai, comb. nov.
Arundinaria Griffithiana Munro in Trans. Linn. Soc. XXVI. 30 (1868).

6. **C. Hookeriana** Nakai, comb. nov.
Arundinaria Hookeriana Munro, l. c. 29.

7. **C. intermedia** Nakai, comb. nov.
Arundinaria intermedia Munro, l. c. 28.

8. **C. khasiana** Nakai, comb. nov.
Arundinaria khasiana Munro, l. c. 28.

9. **C. marmorea** Makino in Tokyo Bot. Mag. XXVIII. 154 (1914).
Bambusa marmorea Mitford, Bamb. Gard. 93 (1896).

10. **C. polystachya** Nakai, comb. nov.
Arundinaria polystachya Kurz apud Gamble, Ind. Bamb. 7, t. 5 (1896).

11. **C. pumila** Nakai, comb. nov.
Arundinaria pumila A. Chevalier & A. Camus in Bull. Mus. Hist. Nat. Paris, XXVII. 450 (1921).

12. **C. quadrangularis** Makino in Tokyo Bot. Mag. XXVIII. 153 (1914).
Bambusa quadrangularis Fenzi in Bull. Soc. Tosc. Ort. V. 401 (1880).

VI. Sinobambusa Makino

Vaginae culmorum appendiculatae deciduae; internodia eximie elongata; gemmae plures; setae orales rigidae laeves. Spiculae racemosae subphyllopodae; glumae tessellatae, exteriores acutae; stamina 3; styli 2; stigmata ciliata.

1. **Sinobambusa elegans** Nakai, comb. nov.
Arundinaria elegans Kurz in Jour. As. Soc. Bengal, XLII. 248 (1873).

2. **Sinobambusa tootsik** Makino in Jour. Jap. Bot. II. 8 (1918).
Arundinaria Tootsik Makino in Tokyo Bot. Mag. XIV. (62) (1900).

VII. Oreiostachys Gamble

Vaginae culmorum appendiculatae deciduae; gemmae plures; setae orales rigidae divaricato-patentes laeves. Spiculae subglomeratae vel breviter ramosae; involucra et glumae exteriores coriacea, non tessellata, obtusa; stamina 6; styli 2; stigmata ciliata, non plumosa.

1. **Oreostachys ciliata** Nakai, comb. nov.
Arundinaria ciliata Camus in Bull. Mus. Nat. Hist. Paris, XXV. 672 (1919).

2. **Oreostachys Pullei** Gamble apud Koorders in Versl. Afdeel. Natuurk. Kon. Akad. Wetensch. 1908, 657.

VIII. Fargesia Franchet

Vaginae culmorum appendiculatae deciduae; gemmae plures; setae orales rigidae, fuscae, parce ciliatae vel glabrae. Involucra magna convoluta et spiculas congestas lateraliter amplectens, ita inflorescentia subunilateralis; glumae non tessellatae, sed elevato-nervosae, aristato-acuminatae; stamina 3; stylus 1, elongatus; stigmata 3, plumosa.

1. **Fargesia densiflora** Nakai, comb. nov.
Arundinaria densiflora Rendle in Jour. Linn. Soc. XXXVI. 434 (1904).

2. **Fargesia spathacea** Franchet in Bull. Soc. Linn. Paris, II. 1067 (1893).

Conspectus Generum

Stylus 1, trifidus.
Stamina 6. Gemma solitaria; setae orales scabrae ..... *Sasa*.
Stamina 3.
Vaginae culmorum inarticulatae persistentes, ita nodi ob vaginas emortuas saepe fibrosi.
Gemma solitaria.
Setae orales scabrae fuscae. Rami e basi ramulosi. Paleae subaequales. *Arundinaria*.
Setae orales laeves albae. Rami basi cum nodis 3–5 nudis. Palea una ceteris subduplo longior ..... *Pseudosasa*.
Gemmae plures, parallelae; setae orales laeves. Glumae subcoriaceae tessellatae; paleae inaequales ..... *Pleioblastus*.

Vaginae culmorum complete vel subcomplete articulati, deciduae. Gemmae plures.
Spiculae racemosae vel paniculatae; glumae conspicue vel inconspicue tessellatae. ..... *Semiarundinaria.*
Spiculae congestae unilaterales; glumae aristato-acuminatae non tessellatae, sed conspicue elevato-nervosae..... *Fargesia.*
Styli 2, liberi vel basi coaliti.
Stamina 6. Spiculae subglomeratae vel breviter ramosae; glumae coriaceae non tessellatae. Setae orales radiatae, laeves..... *Oreiostachys.*
Stamina 3.
Gemma solitaria; vaginae culmorum persistentes. Spiculae paniculatae. Setae orales scabrae vel setulosae..... *Indocalamus.*
Gemmae plures, parallelae. Vaginae culmorum e basi articulatim deciduae. Spiculae racemosae. Setae orales laeves.
Internodia anormaliter elongati. Glumae tessellatae laeves. Vaginae culmorum appendiculatae..... *Sinobambusa.*
Internodia non valde elongati. Glumae non tessellatae sed longitudine elevato-nervosae. Vaginae culmorum breviter vel non appendiculatae. *Chimonobambusa.*

The following species described under Arundinaria are incompletely known and their proper position is therefore indeterminable.

A. anceps Mitford, Bamb. Gard. 181 (1896).

A. armata Gamble, Ind. Bamb. 130, t. 119 (1896).

A. jaunsarensis Gamble, l. c. 23. t. 22.

A. Kurzii Gamble, l. c. 25, t. 25.

A. Manni Gamble, l. c. 26. t. 26.

A. microphylla Munro in Trans. Linn. Soc. XXVI. 32 (1868).

A. gracilis Blanchard in Rev. Hort. 1886, 490.

A. Nagashima Pfitzer apud J. Houzon in Mitt. Deutsch. Dendr. Ges. XVI. 226 (1907).

A. nitida Mitford in Gard. Chron. ser. 3, XVIII. 186, t. 33 (1895).

A. Ragamowskii (Wheeler) Pfitzer apud J. Houzon in Mitt. Deutsch. Dendr. Ges. XVI. 224 (1907).

A. Rolloana Gamble; Ind. Bamb. 24. Pl. 23 (1896).

A. suberecta Munro in Trans. Linn. Soc. XXVI. 32 (1896).

The Mexican and South American Bamboos described under Arundinaria apparently belong to two or more undescribed genera.

SYRINGA RUGULOSA, A NEW SPECIES FROM WESTERN CHINA.

SUSAN DELANO McKELVEY.

Syringa rugulosa, sp. nov.

Frutex circiter 2 m. altus vel arbor parva; ramuli tomento denso villoso ad secundum annum persistente vestiti. Folia ovata vel elliptica, 3–7 cm. longa et 1.5–4 cm. lata, acuminata vel acuta, basi cuneata, margine saepe leviter irregulariter undulata, supra dense villosa et rugulosa costa et venis venulisque impressis, subtus densissime molliter villosa, costa et

venis utrinque 4–6 elevatis; petioli 2–5 mm. longi, dense villosi. Flores subsessiles, fasiculati in paniculis lateralibus interdum terminalibus 7–12 cm. longis; rachis dense villosa; calyx campanulatus, plerumque distincte dentatus dentibus ovato-triangularibus acutis vel acuminulatis; corolla tubo gracili 5–7 mm. longo, lobis ovatis 2–3 mm. longis acutiusculis interdum cucullatis; stamina paullo infra faucem inserta antheris pallidis faucem non superantibus.

YUNNAN: undergrowth of the mountains at Tcha-ho; alt. 2600 m., *E. E. Maire*, July, 1914 (type; no. 169, Herb. Roy. Botanic Garden, Edinburgh); thickets of the mountains at Té-long-tsin, alt. 3000 m., *E. E. Maire*, June (no. 503, Herb. Arnold Arboretum).

This species is most closely related to *S. Potaninii* Schneid., which differs in the not distinctly rugulose leaves, less densely pubescent branchlets and inflorescence, in the minute appressed pubescence of the usually truncate calyx, in the longer and narrower corolla-lobes and in the stamens being inserted much below the mouth. The flowers of the specimen from Tcha-ho are according to the collector rose-violet, while those of the specimen from Té-long-tsin are described as white.

AMELASORBUS, A NEW BIGENERIC HYBRID.

ALFRED REHDER.

Amelasorbus (*Amelanchier* × *Sorbus*), gen. hybr. nov.

Intermediate between the parents: from Amelanchier the hybrid differs chiefly in the partly pinnate leaves, the paniculate inflorescence and in the free styles, while from Sorbus (§ Aucuparia) it is distinguished by the mostly undivided leaves, only partly more or less pinnate or pinnately lobed below the middle, in the secondary axes of the compound inflorescence being racemose, not corymbose, in the oblong petals, in the usually 5 styles and in the presence of imperfect false septa in the fruit. Only known in the following form:

Amelasorbus Jackii (*Amelanchier florida* × *Sorbus sitchensis*), hybr. nov.

Frutex robustus, 2–3 m. altus; ramuli robusti, initio laxe villosi, citissime glabri, purpurei vel purpurascentes, vetustiores rubro-fusci, luciduli; gemmae oblongo-ovoideae, 6–8 mm. longae, acutae, perulis exterioribus 4–6, apice et partim ad marginem leviter lanuginosis ceterum glabris purpureo-brunneis. Folia ovalia vel elliptica, rarius oblongo-elliptica, 3.5–6 cm. longa, apice rotundata vel acutiuscula, basi rotundata vel cordata grosse dentata dentibus late ovatis acuminulatis, ad basin pleraque integra, initio laxe villosa, cito glabra, nervis utrinsecus 10–12, pleraque indivisa sed pauca basi lobis vel foliolis 1–3 instructa; petioli 1–25 cm. longi, glabri; folia turionum oblongo-elliptica vel ovato-oblonga, 5–10 cm. longa,

plura basi foliolis 2–4 ellipticis vel elliptico-oblongis 2–3 cm. longis dentatis instructa, supra basin plus minusve lobata lobis apicem versus decrescentibus, supra medium indivisa, ceterum ut in foliis ramulorum floriferorum; petioli 1.5-3 cm. longi; stipulae lineari-lanceolatae, circiter 5 mm. longae, caducae. Inflorescentia paniculata ad 5 cm. longa, tenuiter villosula; axes secundarii racemosi, 1–3 inferiores foliis suffulti, infimus 5–9-florus pedicello infimo interdum 2-floro, apicem versus decrescentes; pedicelli 2–3 mm., in fructu ad 6 mm. longi; hypanthium extus et sepala triangulari-ovata acuminulata utrinque villosula; petala alba, oblonga, 9–10 mm. longa, obtusa, ad basin cuneatam supra lanata, apice sparse lanato-ciliosa; stamina 20, longiora 3 mm. longa, antheris ut videtur sterilibus; styli 5, raro 4, 2.5–3 mm. longi, staminibus paullo breviora, ad medium ovarii liberi basi villosi, hypostylio medio fere ad basin villoso; ovarium apice dense villosum, 4–5-loculare, loculis in parietie exteriore manifeste costata costa post anthesin in lamellam crassam ad medium loculum prominentem accrescente, ideo fructus imperfecte 8–10-loculatus. Fructus subglobosus vel globoso-ovoidea, 6–8 mm. diam., in sicco atro-coerulea, pruinosa, in vivo (sec. collectorem) rubra, coeruleo-pruinosa, sepalis persistentibus erectis ovato-lanceolatis circiter 4 mm. longis coronatus; semina pauca perfecta, ellipsoidea, compressa, circiter 4 mm. longa, castanea.

IDAHO: summit of Elk Butte, Clearwater County, alt. about 2000 m., *J. G. Jack*, no. 1329, September 4, 1918. Cultivated specimens: Arnold Arb. (from seed of no. 1329) under no. 17688, September 20, 1923, and May 19, 1925.

This interesting hybrid was discovered by Professor J. G. Jack in Idaho on the open and rocky summit of Elk Butte. In general appearance the original specimens as well as the plants growing in the Arnold Arboretum have the aspect of a vigorous plant of Amelanchier, and only on closer inspection one may notice the presence of partly pinnate leaves and the compound inflorescence. The flowers, too, with their oblong upright petals look much like those of Amelanchier, but the styles are distinct, and the false partitions of the fruit extend only to about the middle of the locule and are abnormally thick in the sterile cells.

The parents of the hybrid are apparently *Sorbus sitchensis* Roem. and *Amelanchier florida* Lindl. of which specimens were collected on the same date at the same locality; the first species being represented by Jack's no. 1333 and the second by his no. 1332. From *Sorbus sitchensis* the hybrid is easily distinguished by the mostly simple leaves, smaller, not viscid winterbuds, the smaller paniculate inflorescence with racemose not corymbose branches, the oblong petals, 4–5 styles, and by the dark colored pruinose fruit with long ovate-lanceolate sepals. From *Amelanchier florida* the hybrid differs chiefly in the larger, more coarsely serrate and occasionally partly pinnate or lobed leaves, in the villous apex of the bud-scales, in the compound inflorescence, shorter petals, distinct styles and in the larger fruit with upright or nearly upright sepals, with shorter

false partitions and with dry flesh of poor flavor as noted by the collector.

Several bigeneric hybrids have been recorded in the subfamily Pomoideae of Rosaceae, as between Crataegus and Mespilus, Pyrus and Sorbus, Sorbus and Aronia, but all these genera are close allies and the four last named are considered by some botanists congeneric, while Amelanchier and Sorbus are much less closely related and differ widely in the type of the inflorescence and in the structure of the ovary which in Amelanchier has false septa like Peraphyllum; in this respect these two genera differ from all other genera of the subfamily. The distinct types of the inflorescence and the difference in the structure of the ovary produce in the hybrid a peculiar combination; also those leaves of the hybrid which are partly pinnate are of irregular and more or less monstrous shape and resemble those of the hybrids between Aronia and the section Aucuparia of Sorbus, two genera otherwise very closely related.

THE RHODODENDRONS OF EASTERN CHINA, THE BONIN AND LIUKIU ISLANDS AND OF FORMOSA.

ERNEST H. WILSON

In this article the territory embraced lies between Latitudes 19° and 34° N. and Longitude 113° and 142° E. and in the south includes the island of Hainan. Much of the region is very little known to the western world. A glance at a good map of the Orient shows off the coast of China a string of islands stretching southward like stepping stones from Japan toward the Equator. They may be likened to a rope of unmatched pearls with Formosa athwart the Tropic of Cancer forming the pendant. All these islands, some little more than mere rocks thrust above the ocean, others of fair size, are now an integral part of the Japanese Empire. They are little known and very few botanists other than Japanese have had opportunity of visiting them. More fortunate than many it has been my privilege to tread their shores. Bonin and Liukiu I botanised in the spring of 1917; Formosa in the early spring and autumn of 1918. These islands enjoy a warm-temperate or almost tropical climate varying somewhat according to their latitudinal positions but all are lapped by the waters of the warm Japan Gulf stream. Formosa has a backbone of mountains whose higher peaks average over 10,000 ft. in height and in consequence boasts cool temperate regions. They support a luxuriant vegetation, largely endemic, with a coastal fringe of widespread subtropical species. Only a few plants indigenous to these islands are in cultivation but we are indebted to Liukiu for the well-known *Cycas revoluta* L. and the indispensable *Lilium longiflorum* Thunb. which long ago reached us by way of Japan.

The flora of the Bonin Islands is very largely endemic; that of Liukiu is related to the flora of Japan; the mountain flora of Formosa shows

a remarkable affinity with that of western China. General accounts of these floras I published in volumes I. and II. of the Arnold Arboretum Journal (1919–20).

The flora of eastern China in the main is distinct from that of western China, the province of Hupeh being a sort of hinterland between the two regions. The flora of Hongkong and neighboring islands was once supposed to be rich in endemic plants but many of these have since been found on the mountains of Kwangtung and Fokien provinces and some in the more distant Yunnan province. The island of Hainan remains little known and though the flora is doubtless rich in endemic plants it is related to that of Mindanao Island on the one hand and continental China and Tonking on the other.

So far as Rhododendrons are concerned the species found in the different regions are mostly local in distribution. From the whole territory under survey some 40 species are at present known but our knowledge of the flora of Fokien and southeastern China is exceedingly limited and without doubt many new Rhododendrons remain to be discovered. Nevertheless the whole region represents merely the fringe of distribution and is in no sense a centre of the Rhododendron family. Still it is worthy of investigation and many of its Rhododendrons are handsome plants.

From Bonin, Liukiu and Formosa some 22 species of Rhododendron are at present known, of which 18 are endemic. The first known was *R. scabrum*, named by G. Don in 1834, native of the Liukiu and long cultivated in south Japan, but how and where Don obtained his material we do not know. The last discovered was *R. boninense* Nakai in 1920 and introduced into cultivation by means of seeds which I secured through Dr. Nakai's assistance in the late autumn of 1924. The first Formosan species discovered was *R. Oldhamii* by Richard Oldham in 1864 after whom it was named by the Russian botanist Maximowicz. It was introduced into cultivation in 1878 by Charles Maries and reintroduced by myself in 1918 at which time I also introduced three other species from Formosa. The remaining endemic species are not yet in cultivation though several are well worthy of the honor.

The Bonin species (*R. boninense* Nakai) is known from one isolated locality only and is the most eastern and remote representative of the Azalea group. With its white flowers it reminds one of *R. mucronatum* G. Don, better known as *Azalea ledifolia*.

From the Liukiu Archipelago and the neighboring Kawanabe Islands, four species of Rhododendron are known. One species, the red-flowered *R. scabrum* G. Don, better known as *Azalea sublanceolata*, is endemic, so, too, is the variety *eriocarpum* Hayata of *R. Simsii* Planch. known only from the Kawanabe Islands. *R. Tashiroi* Maxim. is common on Yakushima and grows also on Mt. Kirishima and elsewhere in Kyushu, Japan. The fourth species, *R. leiopodum* Hayata, is common to Yaeyama, the

most southern of the Liukiu Islands, and to Formosa. On Okinawa, *R. scabrum* G. Don with large gorgeous red flowers is, locally, fairly plentiful but nowhere in the Liukiu Archipelago are Rhododendrons a prominent feature of the vegetation, neither can they be called common plants.

Three common east China Rhododendrons (*R. Simsii* Planch., *R. Mariesii* Hemsl. & Wils., *R. ovatum* Planch.) have just a foothold on Formosa, but all are rare plants there. This island with its high mountains and magnificent forests has so far yielded 19 species of Rhododendron of which 15 are endemic. On the higher mountains *R. Morii* Hayata and *R. pseudochrysanthum* Hayata are abundant as undergrowth in the forests of Fir, Spruce and Juniper, growing socially and covering large areas. *R. pseudo-chrysanthum* Hayata extends well above the tree line and as a low shrub with gnarled branches grows on the summit of Mt. Morrison, 13,072 ft. above sea-level. On rocky ridges and slopes between 11,000 and 13,000 ft. it forms with *Juniperus morrisonicola* Hayata well-nigh impenetrable thickets. But it is only on the higher parts of this central range that one familiar with Rhododendrons in western China and Japan would call them common plants in Formosa.

In the rich rain-forests on Arisan between 6000 and 8500 ft. altitude the epiphytic *R. Kawakamii* Hayata is moderately plentiful. On open grass-clad deforested mountain slopes beyond Arisan and toward Mt. Morrison one Azalea (*R. rubropilosum* Hayata) grows socially in considerable numbers. Through forests of mixed trees *R. leiopodum* Hayata is scattered over much of the island between 2000 and 8000 ft. altitude. From sea-level up to 7500 ft. altitude, the red-flowered *R. Oldhamii* Maxim. is plentiful being the low-level Azalea of the islands and in this respect the homologue of *R. Simsii* Planch. in China and *R. obtusum* Planch. in Japan. The other Formosa species may be considered rare in the present state of our knowledge.

In all 21 species of Rhododendron are known from the mainland of eastern China, 14 of which have not been reported from elsewhere. Of this region I have but little personal acquaintance. On the Lushan Mountains in Kiangsi I have collected *R. Fortunei* Lindl., *R. ovatum* Planch., *R. Mariesii* Hemsl. & Wils., *R. molle* G. Don and *R. Simsii* Planch., and on Hongkong have seen *R. Championae* Hook. in a wild state. On the Lushan only *R. Simsii* Planch. and *R. ovatum* Planch. are common plants. The first-named is found everywhere in China from sea-level up to 6000 feet except in the north where the climate is too severe. *Rhododendron Fortunei* Lindl. was the first true Rhododendron introduced from the Orient. This handsome species with its fragrant, pink, 7-lobed flowers has been of immense service to Rhododendron breeders, in England especially, and is part parent of a race of magnificent hybrids now widely cultivated. *R. ovatum* Planch., like *R. Mariesii* Hemsl. and *R. molle* G. Don, has its western limits in Hupeh province.

All three appear to be plentiful in Chekiang province. *R. Championae* Hook. for half a century considered endemic on Hongkong is now known to grow as far north as the Chekiang-Fokien border. The other species are little known and local in distribution, but our knowledge of the flora of southeastern China is so fragmentary that it is unsafe to generalize.

Of the 40 species known from this region three species are described here for the first time. The subgenus Eurhododendron is represented by 16 species, Azaleastrum by 7 species and the subgenus Anthodendron by 17 species. Keys to the species are given but those for the subgenera and sections are omitted since they are to be found in my account of the Rhododendrons of Hupeh in Jour. Arnold Arb. V. 84–107 (1924).

Subgen. I. EURHODODENDRON Endl.

Sect. I. LEIORHODIUM Rehd.

KEY TO THE SPECIES

Corolla 7-lobed ..... 1. *R. Fortunei*
Corolla 5-lobed
  Shoots and leaves floccose-tomentose, often glabrescent
    Calyx glandular-ciliate
      Capsule not curved ..... 2. *R. pseudochrysanthum*
      Capsule curved ..... 3. *R. anwheiense*
    Calyx not glandular
      Ovary glabrous ..... 4. *R. nankotaisanense*
      Ovary pubescent ..... 5. *R. Morii*
  Shoots glabrescent; leaves encrusted with firm, pale grey indumentum on lower surface; never pustulate
    Leaves usually broadest above the middle
      Calyx not glandular-ciliolate; style glabrous ..... 6. *R. formosanum*
      Calyx glandular-ciliolate; style sparsely stipitate-glandular .. 7. *R. simiarum*
    Leaves broadest at or below the middle; calyx glabrous, style sparsely pilose 8. *R. fokienense*
  Shoots glabrescent; leaves pustulate on the lower surface .... 9. *R. hyperythrum*
  Shoots glabrous; leaves glabrous, subcoriaceous, green on both surfaces
    Pedicels glabrous ..... 10. *R. Westlandii*
    Pedicels glandular-villose
      Ovary villose ..... 11. *R. Henryi*
      Ovary glabrous ..... 12. *R. Dunnii*
  Shoots and leaves when young more or less densely clothed with shining brown pilose hairs, many of them appressed ..... 13. *R. Tashiroi*

1. Rhododendron Fortunei Lindley in Gard. Chron. 1859, 868.—Hooker f. in Bot. Mag. xcii. t. 5596 (1866).—Luscombe in Gard. Chron. 1868, 1067.—Maximowicz in Mém. Acad. Sci. St. Pétersb. sér. 7, xvi. no. 9, 21 (Rhodod. As. Or.) (1870).—Mangles in Gard. Chron. n. s. xv. 299, 363 (1881).—Hemsley in Jour. Linn. Soc. xxvi. 23 (1889).—Bretschneider, Hist. Eur. Bot. Disc. China, 476 (1898).—Bean in Flora & Sylva, iii. 164 (1905); Trees & Shrubs Brit. Isles, ii. 357 (1915); in Rhod. Soc. Notes, i. 187 (1918).—Schneider, Ill. Handb. Laubholzk. ii. 487, fig. 322 g–l (1909).—Hemsley & Wilson in Kew Bull. Misc. Inform. 1910,

109, as to the Kiangsi plant.—Rehder & Wilson in Sargent, Pl. Wilson. I. 541 (1914).—Millais, Rhodod. 169 (1917); II. 144 (1924).

Bush 2–6 m. tall with stout glabrous branches pruinose the first year. Leaves glabrous, coriaceous, elliptic-oblong, 7.5–20 cm., usually 11–18 cm. long, 3–7 cm., usually 3.5–6 cm. wide, obtuse or rounded, usually apiculate, base rounded, often sub-cordate, sometimes abruptly narrowed and short-cuneate, dark green above, pallid below, costa very prominent on under surface, secondary veins ascending-spreading; petiole stout, glabrous, often pruinose on upper side, 2–3 cm. long. Flowers fragrant, 6–12 or more, racemose-corymbose, forming a broad dome-shaped truss; rhachis stout, 3.5–6 cm. long, glabrous, sometimes sparsely short-stipitate-glandular; calyx oblique, annular, minutely toothed, glabrous; corolla pink, wide-funnelform-campanulate, 4–7 cm. long and broad, 7-lobed, lobes spreading, rounded or truncate, often emarginate; stamens 12–16, of very unequal length, half to two-thirds length of corolla, filaments slender, usually sparingly papillose at base, anthers oblong, 2–3 mm. long; pistil exceeding stamens, shorter than corolla, ovary conic, about 0.5 cm. long, usually sparingly glandular, style sparsely glandular, thickened below capitate slightly lobed stigma. Fruit woody, erect, pruinose, oblong-ovoid to ovoid, 2–3 cm. long, 1.2–1.5 cm. broad, slightly furrowed, crowned by remains of style, slightly verruculose from remains of glands; pedicels rigid, erect or ascending, 1.5–3 cm. long; seed flattened oblong-obovoid, about 3.5 mm. long, immersed in lustrous wing.

Habitat: eastern China, Chekiang and Kiangsi provinces.

This handsome Rhododendron is characterized by its pruinose shoots, dark green leaves pallid on the under surface and usually subcordate or rounded at the base, its pink very fragrant blossoms with more or less glandular pedicels and pistil, by its 7-lobed corolla, and by its large erect pruinose fruit. It was the first Chinese Rhododendron with a 7-lobed corolla discovered and the first species hardy in the British Isles to be introduced from China. The number of short-stipitate glands on the pedicels varies and often they are absent or virtually so; this is also true of the glands on the pistil. Occasionally there are a few sessile glands on the inner surface of the corolla. The length of the stamens also varies. In other respects the species is very constant. The truss is large though somewhat loose and is borne well above the bold foliage; the fragrance is most pleasing.

It was discovered in October, 1855, by Robert Fortune on the mountains southwest of Ningpo in Chekiang province. The plants bore ripe fruits and Fortune sent seeds to Mr. Glendinning, a nurseryman at Chiswick, near London, who successfully raised a stock of young plants. The species is common on other mountains of the Chekiang province and especially so on the Lushan range of the contiguous province of Kiangsi where it has been collected by several people including myself. The

Lushan range appears to be the western limit of its distribution. The mountains have been deforested and are now covered with a dense growth of miscellaneous shrubs. Among these and especially alongside torrents Fortune's Rhododendron luxuriates.

Though grown and appreciated at Kew and in a few other gardens in the south of England, *R. Fortunei* Lindl. does not appear to have been a common plant in British gardens. In the Arnold Arboretum and elsewhere in New England it is not hardy. The late Professor Isaac B. Balfour was at one time sceptical of the true species being in cultivation inclining to the belief that it has been lost and its name in gardens usurped by plants of hybrid origin. I know the Kew plant very well and in this herbarium are specimens collected from it so long ago as 1884 which agree perfectly with specimens collected in China from wild plants. I agree with Bean (in *Rhodod. Soc. Notes*, I. 187 [1918]) that there are really no reasons for doubting the genuineness of the plant growing at Kew as *R. Fortunei*.

In the hands of the hybridist *R. Fortunei* Lindl. has proved a most prolific and extremely valuable parent. The first hybrid appears to have been × *R. Luscombei* which resulted from the crossing of *R. Fortunei* and *R. Thomsonii* Hook. f. about 1880 by Mr. T. Luscombe of Coombe Royal, Kingsbridge, Devon. Among the more recent hybrids is × *R. Loderi* raised by Sir E. Loder at Leonardslee by crossing *R. Fortunei* and *R. Griffithianum* Wight in 1901. This hybrid has huge flowers pink passing to white each from 6 to 7 inches in diameter and by many is considered to be the most magnificent hybrid Rhododendron ever raised. The only *R. Fortunei* hybrid hardy in the Arnold Arboretum is one named "Duke of York" raised by George Paul of Cheshunt which has been growing here since January, 1915.

For other named hybrids see Millais, Rhodod. 170 (1917).

2. **Rhododendron pseudochrysanthum** Hayata in Jour. Coll. Sci. Tokyo, xxv. art. 19, 154, t. 26 (Fl. Mont. Formos.) (1908).—Kanehira, Formos. Trees, 319, fig. 12, 326 (1917).—Millais, Rhodod. 231 (1917).
Rhododendron chrysanthum Matsumura & Hayata in Jour. Coll. Sci. Tokyo, xxii. 218 (Enum. Pl. Formos.) (1906).—Not Pallas.

Bush 0.3–3 m. tall, branches very numerous, shoots relatively stout, clothed with gray or rufous floccose tomentum, glabrescent; bud-scales persisting on shoots for 1–3 years. Leaves crowded, very numerous, coriaceous, elliptic-oblong to oblanceolate-oblong or lanceolate, 2–8 cm., usually 4–6 cm. long, 1.5–3.5 cm., usually 2–2.5 cm. wide, subacute, apiculate, base abruptly rounded, rarely narrowed, when young densely clothed with rufous or gray floccose tomentum, upper surface soon glabrescent, lustrous green, reticulate, lower surface floccose-tomentose, glabrescent or glabrous when a few months old, midrib and secondary veins impressed above, midrib prominent, glabrous or floccose below; petiole stout, flattened, 0.5–1 cm. long, floccose or glabrous. Flowers

10–20, crowded in umbellate corymb; rhachis 1–2 cm. long; pedicels 1.5–3 cm. long, short-stipitate-glandular and with rufous pubescence; calyx minute, saucer-shape, with 5 irregular small triangular or rounded teeth, glandular, ciliolate; corolla broad-campanulate, 5-lobed, 3–4 cm. long and broad, lobes rounded, emarginate; stamens 10, shorter than corolla, filaments flattened and villose at base; pistil as long as corolla; ovary ovoid, 0.5 cm. long, furrowed, clothed with rufous glandular pubescence, style glabrous, stigma capitate, lobed. Fruit on elongated, erect or ascending pedicels, short-cylindric, 1–1.5 cm. long, 0.5 cm. broad, furrowed, glandular, crowned by remains of style; seed shining pale brown, ovoid, almost wingless.

Habitat: Formosa, higher mountains of the central range.

On the higher peaks of the central range this species grows gregariously and covers large areas in impenetrable thickets. At most it does not exceed 10 ft. in height, and is commonly from 3–5 ft. tall, with gnarled, twisted, lichen-clad stems. On the summit of Mt. Morrison where it grows associated with dwarf alpine Willows and Junipers it is less than a foot high. It prefers open, rocky wind-swept situations and these it struggles hard to dominate.

I did not see it in bloom but gathered seeds and ripe fruiting material in late October, 1918. For my description of the flowers I am indebted to a specimen collected on Mt. Taihasen by T. Ito in 1915. It is a well-marked species most closely related to *R. Wasonii* Hemsl. & Wils., native of extreme western Szechuan. It also has marked affinity with *R. Przewalskii* Maxim. the most alpine member of the section Leiorhodion known from western Szechuan. In all three species the rufous floccose tomentum on shoots and leaves varies greatly in quantity and in persistency.

In my mind *Rhododendron pseudochrysanthum* Hayata will always be associated with my struggle across the central range to the summit of Mt. Morrison. After having been storm-bound under some over-hanging rocks at 11,000 ft. above sea-level for sixty hours we essayed the ascent of the peak and in a bitterly cold storm of wind and sleet at length stood athwart the Tropic of Cancer on the crumbling summit of Mt. Morrison 13072 ft. above sea-level, the highest mountain in the Japanese Empire and the loftiest peak between the Sierra Nevadas of western North America and the snow-clad ranges of the Chino-Thibetan borderland. As a souvenir of the conquest I gathered seeds of this Rhododendron on the peak of Mt. Morrison (I could have collected them lower down) which were sent to the Arnold Arboretum and distributed. This species is now growing in gardens in the British Isles and elsewhere but I have not heard that it has flowered. It was discovered prior to 1900 on Mt. Morrison by a Japanese named Yamashita, and wrongly referred by Matsumura to *R. chrysanthum* Pallas, a species with which it has very little in common. It was rediscovered in the same locality by Messrs.

T. Kawakami and U. Mori in November, 1906 and later described as a new species by Hayata.

3. **Rhododendron anwheiense**, sp. nov.[1]

Shrub with numerous stout branches sparingly floccose-tomentose when young; winter-buds acute, glabrous, scales ciliolate. Leaves glabrous, coriaceous, crowded at ends of shoots, ovate-lanceolate, 3–6 cm. long, 1.5–3 cm. wide, acute, mucronulate, base rounded or abruptly narrowed, upper surface bright green, reticulate, lower paler, areolate, costa impressed above, secondary veins ascending-spreading; petiole 0.5–1 cm. long, channelled above, sparingly gray-floccose-tomentose. Flowers not seen. Fruit umbellate, erect, 6–10, cylindric, 1.2–1.8 cm. long, curving, furrowed, crowned by remains of style, subtended by persistent oblique saucer-shape calyx with minute triangular glandular-ciliolate teeth; seeds shining dark brown, oblong, 2 mm. long, wingless with slight prolongation of testa at base and apex.

Habitat: eastern China, Anwhei province.

This new species is characterized by its small glabrous leaves, reticulate on the upper surface, its glandular-ciliate calyx-teeth and by its glabrous cylindric curving capsules on erect pedicels. It is most closely related to *R. Przewalskii* Maxim. which differs in its leaves being clothed on the under side with a gray to brownish floccose and crustaceous indumentum; it also has a stouter fruit. My material is poor but the plant is so distinct that I do not hesitate to name it. It has no close affinity with any species known from eastern or central China which is strange when its habitat is considered. We know very little about the botany of Anwhei province and the finding of this distinct Rhododendron suggests the presence of other new plants. The specimen was collected on Wang-shan at 1800 m. alt. in open rocky places on August 28, 1923, by H. K. Ip (No. 4784 ex Herb. University of Nanking.)

4. **Rhododendron nankotaisanense** Hayata, Icon. Pl. Formos. IX. 66 (1920).

Bush with branches thinly floccose-tomentose. Leaves coriaceous, glabrous, oblong-lanceolate, 5.5–9 cm. long, 2.5 cm. wide, acute, base rounded, dark green, costa impressed above, secondary veins indistinct, ascending-spreading; petiole 1.5–2 cm. long, channelled above. Flowers

[1] **Rhododendron anwheiense**, sp. nov. Frutex ramis robustis numerosis, juvenilibus sparse floccoso-tomentosis; gemmae acutae, glabrae, perulis ciliolatis. Folia glabra, coriacea, in apice ramulorum congesta, ovato-lanceolata, 3–6 cm. longa et 1.5–3 cm. lata, acuta, mucronulata, basi rotundata vel subito contracta, supra laete viridia, reticulata, subtus pallidiora, areolata, costa supra impressa, venis, ascendenti-patentibus; petioli 0.5–1 cm. longi, supra canaliculati, sparse cinereo-floccoso-tomentosi. Flores non visi. Fructus 6–10, umbellati, erecti, cylindrici, 1.2–1.8 cm. longi, curvati, sulcati, styli vestigio coronati, calyce persistente obliquo cupuliformi lobis minutis triangularibus glanduloso-ciliolatis instructo suffulti; semina lucida, intense brunnea, oblonga, 2 mm. longa, exalata, testa basi et apice leviter protracta.

umbellate; pedicels slender, 1.5–2 cm. long, glabrous; calyx glabrous, saucer-shaped, with 5 minute triangular acute or obtuse teeth; corolla campanulate, about 3 cm. long and broad, 5-lobed, lobes spreading, rounded, emarginate; stamens 10, unequal, rather shorter than corolla, filaments flattened and villose at base; pistil slightly exceeding stamens, ovary oblong-ovoid, 0.4–0.5 cm. long, furrowed, glabrous, style filiform, glabrous; stigma capitate, lobed. Fruit unknown.

Habitat: Formosa, Nankotaisan, alt. 3300 m.

This species is characterized by its glabrous, oblong-lanceolate leaves, its relatively small campanulate flowers with glabrous pedicels and pistil. It is a critical species closely related to *R. Morii* Hayata and may indeed be a glabrous condition of that species which is larger in all its parts, with the petiole and often the under surface of the leaves sometimes floccose-tomentulose, the pedicels short stipitate-glandular and the ovary clothed with short red-brown hispid pubescence. The material available is, however, too fragmentary for accurate comparison. It consists of two leaves, two flowers and two separated pistils of the cotype of *R. nankotaisanense* Hayata. The author describes the filaments as glabrous whereas in the flowers I have they are densely villose at the base.

This species was discovered in April 29, 1917, by S. Sasaki on Mt. Nankotaisan and does not appear to have been re-collected or found elsewhere. It is not in cultivation.

5. **Rhododendron Morii** Hayata in Jour. Coll. Sci. Tokyo, XXX. art. 1, 173 (Mat. Fl. Formos.) (1911); Icon. Pl. Formos. III. 139 (1913); VI. 28 (1916).—Kanehira, Formos. Trees, 319, fig. 1, 324 (1917).

Rhododendron brachycarpum Hayata in Jour. Coll. Sci. Tokyo, XXV. 152 (Fl. Mont. Formos.) (1908).—Not G. Don.

Rhododendron pachysanthum Hayata, Icon. Pl. Formos. III. 140 (1913).—Kanehira, Formos. Trees, 319, fig. 4, 325 (1917).

Bush 2–8 m. or tree 10 m. tall with trunk 1 m. in girth, much branched, branches rather slender, with short gray scurfy tomentum, usually soon glabrous or glabrescent. Leaves subcoriaceous, often crowded, oblong-lanceolate, 6–15 cm., usually 8–12 cm. long, 2–4 cm., usually 2.5–3 cm. wide, acute or short-acuminate, apiculate, base abruptly narrowed, rounded, sometimes sub-auriculate, often broad-cuneate, occasionally oblique, when mature green, glabrous and somewhat lustrous on both surfaces, sometimes sparsely floccose-tomentulose on lower surface, midrib impressed above, prominent below, secondary veins obscure on upper, often slightly raised on lower surface; petiole 1–2.5 cm. long, channelled above, glabrescent or gray floccose-tomentulose. Flowers 6–20, umbellate-racemose; rhachis 1–3 cm. long; pedicels ascending-spreading or spreading, 1.5–2.5 cm. long, short-stipitate-glandular; calyx minute, saucer-shaped with 5 small triangular teeth, glabrous or nearly so; corolla white, dotted with brown-purple honey guides, campanulate, 3.5–4.5 cm. long and broad, 5-lobed, lobes somewhat spreading,

rounded, emarginate; stamens 10, of unequal length, shorter than corolla, filaments flattened and puberulous at base; pistil overtopping stamens, included, ovary oblong-ovoid, about 0.6 cm. long, furrowed, clothed with short red-brown hispid pubescence; style curved, glabrous or nearly so, stigma capitate. Fruit cylindric, curved, 1.5–2.5 cm. long, 0.5 cm. broad, furrowed, glabrescent or sparsely pubescent, slightly verruculose; seed ellipsoid, shining pale brown, about 2 mm. long, with minute wing at apex and base.

Habitat: Formosa, forests on central range between 2100 and 3200 m. altitude.

This is the common Rhododendron of the Formosan forests above the elevation of 6500 ft. when it grows to a large size. Very often it is a wide-spreading shrub from 20 to 25 ft. high, occasionally as much as 30 ft., with a trunk 3 ft. in girth. Around Arisan and on the ranges beyond it is plentiful but clings to the edge of the forests of mixed broad-leaf trees and Conifers. I did not see it in bloom but judging from herbarium specimens it is much less showy than many other east Asiatic species. The flowers are white, spotted with brown-purple, numerous, sometimes as many as twenty, in a rounded truss but they are small for such a large and vigorous plant. It is most closely related to *R. pachytrichum* Franch. of western Szechuan which though similar in appearance of flower and foliage has usually densely hairy shoots. Hayata distinguishes his *R. pachysanthum* by its leaves being densely tomentose below, less reticulate on the upper surface and its glabrous style. I do not find these characters so marked neither are they constant, the tomentum on the under surface of the leaves is floccose and may disappear partially or wholly and early or late as is the case with other species having this type of pubescence.

Rhododendron Morii was named by Hayata from material collected in 1908 on Mt. Randai by U. Mori but appears to have been first discovered the year previous by T. Kawakami on Mt. Morrison and wrongly referred to the Japanese *R. brachycarpum* G. Don by Hayata. It has since been found on many mountains of the central range. On October 31, 1918, I gathered ripe seeds on the summit of Arisan and sent them to the Arnold Arboretum who distributed them among friends in Europe and America. It is now growing in several gardens but I have not heard that it has flowered in cultivation.

6. **Rhodódendron formosanum** Hemsley in Kew Bull. Misc. Inform. 1895, 183.—Matsumura & Hayata in Jour. Coll. Sci. Tokyo, XXII. 218 (Enum. Pl. Formos.) (1906).—Matsumura, Ind. Pl. Jap. II. pt. 2, 459 (1912).—Hayata, Icon. Pl. Formos. III. 132 (1913); IX. 65 (1920).—Kanehira, Formos. Trees, 319, fig. 3, 320 (1917).—Hutchinson in Millais, Rhodod. 168 (1917).

Bush 2–6 m. or tree 10 m. tall with trunk 1 m. girth, shoots rigid, purple-brown, when young clothed with pale gray scurfy tomentum, soon glabrescent. Leaves crowded, oblong-lanceolate to oblong-oblanceo-

late, 7–12 cm. long, 1–3 cm. wide, subacute or obtuse, base narrowed, cuneate, upper surface lustrous green, lower densely covered with pale gray crustaceous indumentum, midrib impressed above, prominent below, secondary veins inconspicuous; petiole 1–1.5 cm. long, glabrous. Flowers 10–20 in rounded umbellate corymbs; rhachis 1.5–2 cm. long; outer bud-scales glabrous, inner densely clothed with soft appressed tomentum; pedicels 1–3 cm. long, clothed with short curled rufous brown pubescence; calyx annular, pubescent, with 5 minute broad rounded or triangular teeth; corolla white or pink with few purple-brown honey-guides, wide-funnelform, about 3–4 cm. long, 3.5–4.5 cm. wide, 5-lobed, lobes 1.5 cm. long, rounded or emarginate; stamens 10–12, included, filaments unequal, flattened and villose at base; pistil equalling the corolla, ovary ovoid, 4 mm. long, densely clothed with short appressed gray-brown pubescence, style glabrous, stigma capitate lobed. Fruit not seen.

Habitat: Formosa, central mountains between 1500 and 2000 m. altitude.

The species is characterized by the pale gray under surface of its leaves and by its pubescent pedicels, calyx and ovary. It is most closely related to *R. hypoglaucum* Hemsl., native of central China, which has glandular and less strongly pubescent pedicels and calyx, and a glabrous, narrow-ovoid ovary. Living plants of these two species are quite different in appearance though their morphological differences appear slight when written down.

In mixed forests, rich in species of Oaks, at 5500 ft. altitude near Tentana in Shinchiku prefecture, I found *R. formosanum* Hemsl. in full flower on April 6, 1918, and the above description is based on this material. The species was quite common and often of large size and tree-like in habit. The rounded trusses are of good size and the flowers white or pink in color. First discovered by Augustine Henry in the southern part of the island in 1894 this Rhododendron has since been found in several districts and appears to extend along the central ranges from south to north. It is the most beautiful species of its section known to grow in Formosa and well worth introducing into gardens.

7. **Rhododendron simiarum** Hance in Jour. Bot. XXII. 22 (1884).—Hemsley in Jour. Linn. Soc. XXVI. 30 (1889).—Dunn & Tutcher in Kew Bull. Misc. Inform. add. ser. X. 155 (Fl. Kwangtung & Hongk.) (1912).

Rhododendron Fordii Hemsley in Kew Bull. Misc. Inform. 1894, 5; in Bot. Mag. CXXXII. t. 8111 (1906).—Bean in Flora & Sylva, III. 163 (1905).—Dunn & Tutcher in Kew Bull. Misc. Inform. add. ser. X. 155 (Fl. Kwangtung & Hongk.) (1912).—Millais, Rhodod. 168 (1917); II. 143 (1924).

Bush about 2 m. tall, branches numerous, stout, when young clothed with gray floccose tomentum, glabrescent; bud-scales glandular. Leaves crowded at ends of branches, coriaceous, oblanceolate-oblong to lanceolate or oblong-lanceolate, 4–9 cm. long, 2–3.5 cm. wide, obtuse or rounded, base narrowed to petiole, upper surface of young leaves clothed with floccose gray tomentum, later glabrescent, lustrous dark green, reticulate; lower surface densely clad with pale gray or dun-colored crustaceous

indumentum, costa impressed above, raised below, secondary veins ascending-spreading; petiole 1–1.5 cm. long, slightly winged. Flowers 4–6 or more, umbellate-racemose, rhachis 1–2 cm. long, surrounded by semipersistent glandular bud-scales; pedicels ascending-spreading, 2–3 cm. long, sparsely or densely pubescent; calyx discoid, with 5 small triangular acute ciliolate-glandular teeth; corolla pink, pale within with few rose-pink dotted honey-guides, campanulate, about 7.5 cm. long and wide, 5-lobed, lobes spreading, rounded, emarginate; stamens 10–12, unequal, slightly shorter than corolla, filaments sparsely hairy in lower half, anthers yellow; pistil slightly overtopping stamens, equaling the corolla, ovary ovoid more or less clothed with short rufous hairs, style curving, sparsely stipitate-glandular at base, stigma capitate. Fruit woody, ovoid, about 1 cm. long often rufous-pubescent, verruculose, erect on stout ascending-spreading pedicels.

Habitat: Kwangtung province, Lo-fau-shan; Lantao Island.

This is a very distinct plant with rigid stems and crowded coriaceous oblanceolate-oblong to lanceolate obtuse leaves, gray on the lower surface, and small very woody fruits. It is known to me as a cultivated plant in England and whilst pretty in a quiet way it cannot be rated a high class garden plant, moreover, it is tender.

The loan of a fragment of Hance's type (No. 22205) from the Herb. British Museum enables me to establish its identity with *R. Fordii* Hemsl. Presumably no one has heretofore compared actual material, for the identity is obvious.

8. **Rhododendron fokienense** Franchet in Bull. Soc. Bot. France, XLVI. 210 (1899).—Millais, Rhodod. 167 (1917); II. 143 (1924).

Branches glabrous, clothed with dark brown bark; winter-buds ovate, long acuminate, ciliolate. Leaves stout, coriaceous, lanceolate to oblong-lanceolate, 7–10 cm. long, 1.5–2.5 cm. broad, acute, base cuneate, upper surface glabrous, dark lustrous green; under surface densely clothed with pale gray crustaceous indumentum, costa impressed above, prominent below; petiole flattened, 1.5 to 2 cm. long. Flowers 4 to 6, umbellate-racemose; pedicels slender, ascending-spreading, 2 cm. long, sparsely puberulous; calyx annular, obscurely 5-toothed, teeth minute, triangular, acute; corolla funnelform-campanulate, about 4 cm. long and broad, 5-lobed, lobes spreading, rounded or sub-acute, stamens 10, shorter than the corolla, filaments densely pubescent in the lower half; pistil longer than the corolla, ovary villose, style filiform, sparsely pilose near the base, stigma capitate. Fruit not seen.

Habitat: eastern China, Fokien province.

This species is characterized by its long acuminate bud-scales, by the gray under surface of its shining coriaceous leaves, by its thinly puberulous pedicels and by its pilose style. As Franchet points out it is closely related to *R. hypoglaucum* Hemsl. which, however, has rounded not long acuminate bud-scales and a glabrous pistil. It is also very closely

related to *R. formosanum* Hemsl. which is a more vigorous plant with rounded bud-scales, a very much larger inflorescence, and pedicels densely clothed with short curled rufous-brown pubescence and a glabrous style.

Rhododendron fokienense Franch. was discovered on the mountains round Kuatun in April, 1898, by J. de la Touche. It is unknown to me except from Franchet's description and photographs of the type specimens preserved in Herb. Paris. It would appear to be a very critical plant but in the present imperfect state of our knowledge of the flora of Fokien it would be unwise to unite it with any known species. It is not in cultivation.

9. **Rhododendron hyperythrum** Hayata, Icon. Pl. Formos. III. 133 (1913).—Kanehira, Formos. Trees, 319, fig. 5, 320 (1917).

Rhododendron rubropunctatum Hayata, Icon. Pl. Formos. III. 141 (1913).—Kanehira, Formos. Trees, 319, fig. 7, 327 (1917).

Bush with stout branches, glaucescent the first year. Leaves coriaceous, oblong to elliptic-oblong, without petiole 7–12 cm. long, 2–3.5 cm. wide, abruptly subacute, base narrowed, glabrous on upper surface, dotted with rufous pustulate glands on lower, midrib impressed above, prominent below, secondary veins ascending-spreading, slightly raised on under surface; petiole stout, glabrous, 1.5–2.5 cm. long, furrowed above. Flowers racemose-umbellate, 10 or more; pedicels ascending-spreading, 3–4.5 cm. long, sparingly glandular; calyx saucer-shaped with 5 small irregular rounded or acute teeth, glandular; corolla wide-funnelform-campanulate, about 4.5–5 cm. long and broad, dotted with dark honey-guides, 5-lobed, lobes rounded; stamens about 10, unequal in length, shorter than corolla, filaments filiform, flattened and pubescent at base, anthers oblong, 3 mm. long; pistil as long as corolla, ovary ovoid, 0.6 cm. long, furrowed, densely glandular, style filiform, curving, sparsely glandular in lower half, stigma large, capitate, lobed. Fruit not seen.

Habitat: Formosa, Mt. Shichisei, and central regions of the island.

This is a very handsome Rhododendron, well distinguished by the multitude of red-brown minute pustules which dot the lower surface of its elliptic-oblong leaves. It obviously belongs to the section Leiorhodium and not to that of Lepipherum, in spite of the presence of these pustulate leaf-glands. I know of no other species so anomalous. Unfortunately I did not see this Rhododendron growing in Formosa, and my knowledge of it is based on co-type herbarium specimens. The species was discovered in central Formosa by N. Konishi and is not in cultivation. On material collected by S. Sasaki in 1910 on Mt. Shichisei in Taihoku Prefecture, Hayata has based another species (*R. rubropunctatum*). I can find nothing to distinguish these supposed two species; both have the remarkable pustulate glands on the under surface of the leaves.

10. **Rhodcdendron Westlandii** Hemsley in Jour. Linn. Soc. XXVI. 31 (1889).—Dunn & Tutcher in Kew Bull. Misc. Inform. add. ser. X. 155

(Fl. Kwangtung & Hongk.) (1912).—Hutchinson in Millais, Rhodod. 261 (1917); ed. 2, 260 (1924).

Shrub sometimes 6 m. tall; branches thin, rigid, glabrous; bud-scales glabrous, ciliate. Leaves crowded at ends of shoots, subcoriaceous, glabrous, oblong-lanceolate to elliptic-lanceolate, 5–10 cm. long, 1.5–4 cm. wide, acuminate, base cuneate, dark lustrous green above, paler below, margin slightly recurved, secondary veins ascending-spreading; petiole 0.8–1.5 cm. long, glabrous. Flowers umbellate, 6–8 or more; pedicels stout, 1–1.5 cm. long, glabrous; calyx saucer-shaped with 5 minute rounded or acute somewhat erose teeth, glabrous; corolla lilac-color, funnelform-campanulate, 5–6 cm. long and broad, deeply 5-lobed, tube narrow, 1.5–2 cm. long, lobes spreading, spathulate to obovate, rounded; stamens 10, unequal, shorter than corolla, filaments flattened and papillose in lower half; pistil nearly or quite equaling the corolla, glabrous, ovary narrow-ovoid, 0.5 cm. long, furrowed, glabrous, style relatively stout, stigma large, capitate. Fruit not seen.

Habitat: Kwantung province, Lantao Island, Kowloon, and Swatow.

This is a perfectly glabrous species except for a slight pubescence on the basal part of the filaments. It has very numerous ciliolate bud-scales and a several-flowered terminal umbellate inflorescence. The foliage and habit of growth suggests certain species of Pittosporum. The lilac-colored flowers are said to be fragrant. This Rhododendron appears to be a rare and local species and not to have been introduced into cultivation. It was discovered about 1885 by A. B. Westland on Lantao Island; in 1914 W. J. Tutcher found it on the mainland in the new British territory of Kowloon. It was collected on the summit of Phoenix Mt., Swatow in 1905 by S. T. Dunn.

11. **Rhododendron Henryi** Hance in Jour. Bot. XIX. 243 (1881).—Hemsley in Jour. Linn. Soc. XXVI. 24 (1889).—Hutchinson in Millais, Rhodod. 185 (1917); ed. 2, 154 (1924).

Rhododendron ciliato-pedicellatum Hayata, Icon. Pl. Formos. III. 131 (1913).—Komatsu in Matsumura, Icon. Pl. Koisikav. II. 73, t. 121 (1914).

Bush 1 m. or more tall; branches subverticillate, slender, rigid, glabrous; bud-scales glabrous, ciliolate. Leaves thinly coriaceous or chartaceous, clustered at end of shoot, glabrous, lustrous green on both surfaces, oblong-lanceolate to elliptic-lanceolate, 4–7.5 cm. long, 1.5–3 cm. wide, short-acuminate or acute, base narrowed, margin slightly recurved, sometimes obscurely or irregularly serrulate, reticulate, secondary veins spreading, only slightly ascending, branching; petiole 1–1.5 cm. long, stipitate-glandular or glabrous. Flowers umbellate, 5 to several; pedicels 1–1.5 cm. long, clothed with short, curled glandular hairs; calyx discoid, with 5 minute rounded or acute ciliolate, often irregularly pectinate teeth; corolla pink, campanulate, 4.5–5.5 cm. long and broad, deeply 5-lobed, tube narrow-campanulate, 1–1.5 cm. long, lobes spreading, oblong to spathulate, 3–4 cm. long, rounded or subacute,

stamens about 10, shorter than corolla, filaments slender, more or less villose in lower half; pistil overtopping stamens, ovary cylindric, 0.5 cm. long, furrowed, villose, style filiform, glabrous, stigma capitate. Fruit cylindric, 2 cm. long, 0.5 cm. wide, furrowed, verruculose.

Habitat: eastern China, Kwangtung and Fokien provinces.

This species is characterized by its villose ovary, its glandular-villose pedicels, often setose-glandulose petioles and by the curious serrations of many of its leaves. Through the courtesy of the Herb. Brit. Museum and of Kew, I have on loan fragments of Hance's type and from the Herb. Edinburgh I have on loan two specimens collected at Thai-yong, some 60 miles west of Swatow by Dr. J. M. Dalziel. In this herbarium is a specimen (No. 2667) collected on April 26, 1924, by H.H. Chung in Inghok Hsien, Fokien province. This is all the material I have seen. It agrees well and certainly all belong to the same species. Hayata in describing his *R. ciliato-pedicellatum* evidently overlooked Hance's species.

Rhododendron Henryi must be a pleasing and free-flowering species well worth introducing into our gardens. It was discovered in March, 1881 by the Rev. B. C. Henry.

12. **Rhododendron Dunnii,** sp. nov.[1]

A shrub with glabrous slender rigid branches clothed with pale gray bark; bud-scales numerous, ciliolate, glabrous without, glandular on inner surface. Leaves glabrous, thinly coriaceous, oblong-lanceolate to oblanceolate-oblong, 5–9 cm. long, 2.5–4 cm. wide, short-acuminate, base narrowed, cuneate, upper surface lustrous dark green, reticulate with impressed midrib, lower surface dull green, with prominent arching ascending-spreading secondary veins; petioles glabrous, 1–1.5 cm. long. Flowers 4–10 or more in terminal umbellate-corymbs; pedicels 1–2 cm. long, densely glandular-villose; calyx glabrous, discoid with 5 broad-ovate to triangular obtuse or rounded teeth each from 0.5–1.5 mm. long; corolla pink, funnelform, 4–5 cm. long and broad, deeply 5-lobed, tube narrow, 1.5–2 cm. long, lobes spreading, spathulate-oblong to oblong, obtuse or rounded, emarginate or mucronulate;

[1] **Rhododendron Dunnii,** sp. nov. Frutex ramis tenuibus rigidis cortice pallide cinereo vestitis; perulae numerosae, ciliolatae, extus glabrae, intus glandulosae. Folia glabra, tenuiter coriacea, oblongo-lanceolata vel oblongo-oblanceolata, 5–9 cm. longa et 2.5–4 cm. lata, breviter acuminata, basi attenuata, cuneata, supra lucida, intense viridia, reticulata, costa impressa, subtus obscure viridia, venis prominentibus arcuatis ascendenti-patulis; petioli glabri, 1–1.5 cm. longi. Flores 4–10 vel plures, racemoso-umbellati; pedicelli 1–2 cm. longi, dense glanduloso-villosi; calyx glaber, discoideus, lobis 5 late ovatis vel triangularibus obtusis vel rotundatis 0.5–1.5 cm. longis; corolla rosea, infundibuliformis, 4–5 cm. longa ac lata, profunde 5-loba, tubo angusto 1.5–2 cm. longo, lobis patentibus spathulato-oblongis vel oblongis obtusis vel rotundatis emarginatis vel mucronulatis; stamina 10, corolla breviora, filamentis compressis infra medium villosis, antheris oblongis; pistillum glabrum, stamina aequans vel paullo superans, ovario cylindrico circiter 0.7 cm. longo sulcato, stylo filiformi, stigmate capitato. Fructus non visus.

stamens 10, shorter than corolla, filaments flattened, villose on lower half, anthers oblong; pistil glabrous, equaling or slightly exceeding the stamens in length, ovary cylindric, about 0.7 cm. long, furrowed, style filiform, stigma capitate. Fruit not seen.

Habitat: eastern China, Kwangtung and Fokien provinces.

This new species is characterized by its glabrous lustrous leaves, its numerous flowered umbellate-corymbs, its glandular-villose pedicels, and by its glabrous pistil. It is most closely related to *R. Henryi* Hance which has a villose ovary, more acute calyx-lobes usually setose-glandular petioles and often irregularly serrulate leaves. It may also be compared with *R. Westlandii* Hemsl. which differs in its perfectly glabrous pedicels and is stouter in all its parts. I have based this species on a specimen loaned from Herb. Kew which was collected on April 13, 1909, by S. T. Dunn at the bottom of Phoenix Mountain near Swatow (Hongkong Herb. No. 5802). I have also before me two specimens (Nos. 8, 9 in Herb. Edinburgh) collected in Fokien province by J. de la Touche which belong here. The flowers on Dunn's specimen are rather smaller than on La Touche's, otherwise they agree perfectly.

13. **Rhododendron Tashiroi** Maximowicz in Bull. Acad. Sci. St. Pétersb. sér. 3, xxxi. 64 (in Mél. Biol. xii. 489) (1887).—Hemsley in Jour. Linn. Soc. xxvi. 31 (1889).—Matsumura in Tokyo Bot. Mag. xii. 3 (1898); Ind. Pl. Jap. ii. pt. 2, 465 (1912).—Komatsu in Matsumura, Icon. Pl. Koisikav. iii. 115, t. 203 (1917).—Millais, Rhodod. 250 (1917).

Rhododendron spec. Maximowicz in Bot. Jahrb. vi. 64 (1885).

A much-branched shrub 2–6 m. tall; branches slender, more or less clothed with shining brown pilose hairs the first year, afterward glabrous; winter-buds more or less villose. Leaves crowded, subverticillate, short petiolate, coriaceous, oblanceolate or lanceolate to elliptic-ovate, 3–7 cm. long, 1–3.5 cm. broad, acute or abruptly short-acuminate, mucronulate, base cuneate, when young clothed with long appressed gray-brown pilose hairs, upper surface soon glabrous, shining green, reticulate, under surface pallid with more or less persistent straight appressed hairs, midrib impressed above, margin crenulate-serrate; petiole 0.3–0.8 cm. long, more or less hirsute. Flowers umbellate, 2–5, subtended by semipersistent bud-scales; pedicels 0.6–1.2 cm. long, densely clothed with short, shining gray-brown pilose hairs; calyx annular, minutely 5-toothed, pilose and ciliate; corolla pale rose-purple, sparingly spotted with purple-maroon honey-guides, funnelform, 2.5–3.5 cm. long and broad, 5-lobed, lobes spreading, rounded, truncate, emarginate; stamens 10–12, unequal, longest nearly as long as corolla, filaments flattened, glabrous; pistil equaling the corolla in length, ovary ovoid, 3 mm. long, densely clothed with short straight flattened, appressed shining gray-brown hairs, style straight, filiform, thickened upward, glabrous, stigma nearly simple or slightly lobed. Fruit narrow-ovoid, about 1 cm. long, clothed with appressed flattened straight brown hairs.

Habitat: Liukiu Islands, Okinawa, sea-level to 500 m. alt., Kawanabe Islands; Japan, Yakushima and southern Kyushu.

This is a very twiggy plant well characterized by the brown villose pubescence on its winter-buds, by its brown pilose shoots, pedicels and ovary, by the appressed straight hairs on the leaves and by its glabrous filaments. It is very free-flowering and its rosy-purple blossoms are quite attractive. In mixed woods and thickets on Okinawa Island I found this pleasing species to be common. I have material gathered on the Kawanabe Islands by H. Ushio and when in Yakushima in 1914 I found it aplenty in the Cryptomeria forests usually growing epiphytically. In southern Kyushu it would appear to be rare. This is the only species common to Japan and the Liukiu Islands. On Okinawa it was a compact though rather narrow shrub from 2–3 m. tall but on Yakushima it was often twice this height but much more sparingly branched and of poor habit. It was discovered about 1880 on Oshima by Dr. L. Doederlein and on Tanegashima by Y. Tashiro for whom it was named by Maximowicz. There is no record of its having been introduced into gardens. When dealing with the Rhododendrons of northeastern Asia (in Jour. Arnold Arb. IV. 33–56 [1923]), I overlooked this species.

Sect. II. LEPIPHERUM G. Don

KEY TO THE SPECIES

Shoot and petiole densely bearded.....14. *R. Levinei*
Shoot and petiole glabrous.....15. *R. Kawakamii*

14. **Rhododendron Levinei** Merrill in Philip. Jour. Sci. Botany, XIII. 153 (1918).

Shrub 3–4 m. tall with rigid moderately stout branches dotted with glistening chestnut-brown lepidote glands and bearded with spreading rufous strigose hairs the first year, afterward glabrescent; bark thin, peeling, mahogany-brown. Leaves clustered, coriaceous, elliptic to elliptic-obovate, 4.5–8 cm. long, 2.5–4 cm. wide, rounded, truncate, emarginate, mucronulate, base rounded or slightly and abruptly narrowed, margin slightly recurved, ciliate, upper surface reticulate, lustrous dark green with few scattered setose hairs most prominent on impressed costa, lower surface glaucescent, densely dotted with glistening chestnut-brown lepidote glands, secondary veins ascending-spreading, raised on lower surface; petiole stout, 0.8–1.5 cm. long, bearded with red-brown strigose hairs. Flowers unknown. Fruit ellipsoid, 2.5 cm. long, 1.5 cm. wide, rostrate, lepidote, verruculose, subtended by persistent membranous calyx with spreading or deflexed ovate obtuse lobes 0.5–0.8 cm. long; pedicels stout, 1–1.5 cm. long, lepidote; seed 1.5 mm. long, oblong, immersed in pale brown membranous wing.

Habitat: eastern China, Kwangtung province.

A well marked species distinguished by its strigose hairy shoots and petioles and by its obtuse, often truncate, mucronulate leaves, ciliate on the margin, and by its large membranous calyx-lobes. The young

shoots are red-brown and the bark is thin and peeling in the third year. It is most closely related to *R. ciliicalyx* Franch. which has glabrous shoots and petioles, a minute calyx and usually acuminate leaves. *R. Levinei* Merrill was discovered in 1917 on Lo-fau Mountain, and has not been introduced into cultivation.

15. **Rhododendron Kawakamii** Hayata in Jour. Coll. Sci. Tokyo, XXX. art. 1, 171 (Mat. Fl. Formos.) (1911).

Epiphytic shrub, 0.3–1.3 m. tall; branches numerous, slender, often tortuous, glabrous, gland-dotted; bud-scales acute, ciliolate, punctate. Leaves subsessile, coriaceous, glabrous, numerous, clustered into remote false verticils, spathulate to oblanceolate or obovate, 1.5–5 cm., usually 2.5–4 cm. long, 0.8–3 cm., usually 1.5–2 cm. wide, rounded, mucronulate, base narrowed, upper surface dark green, lower paler, often yellow-brown, copiously punctate, margin slightly recurved, midrib and secondary veins impressed above, raised below; petiole 0.2–0.5 cm. long, winged. Flowers racemose-umbellate, 5 or more; pedicels spreading, 2–2.5 cm. long, sparsely gland-dotted; calyx saucer-shaped, 5-lobed, lobes irregular, oblong, lanceolate or triangular, 1–2 mm. long, glandular-ciliolate; corolla glandular-punctate, rotate-campanulate, 1 cm. long, 1.2 cm. broad, 5-lobed, lobes broad-oblong, rounded; stamens 10, shorter than the corolla, unequal, filaments villose at the base, anthers oblong, 2.5 mm. long; pistil shorter than the corolla, ovary ovoid, 2 mm. long, pubescent, style curved, glabrous, stigma capitate. Fruit oblong-ovoid, about 1.2 cm. long, sparsely villose, dehiscing to base, margins of valves waved.

Habitat: Formosa, forests on upper parts of Randai-san and Arisan.

On and around Arisan between 5000 and 8000 ft. above sea-level, this is a very common epiphyte. It is particularly abundant in the forests of *Chamaecyparis formosensis* Matsum. growing high up in the forks and on the branches of these gigantic trees. But it is not confined to this Conifer being found epiphytic on many kinds of trees in these rain forests. It is a bushy plant, from 2 to 5 ft. high and broad, with numerous often gnarled and lichen-clad branches. I did not see it in bloom and my description of the flowers is from Hayata's original account. The species, as Hayata points out, is closely related to *R. emarginatum* Hemsl. & Wils. which is native of southern Yunnan. These with which must be associated *Rhododendron Vidalii* Rolfe and several other Philippine and Malaysian species with their cuneate, spathulate to obovate, verticillate leaves, punctate on the under surface, form a little group distinct from other sections of the vast genus. All are tropical and many of them epiphytic, the last from necessity rather than choice. None are in cultivation.

Rhododendron Kawakamii Hayata was discovered in the neighborhood of Arisan, at an elevation of 7000 ft. above the sea-level, in 1906 by Messrs. T. Kawakami and U. Mori.

SECT. III. RHODORASTRUM MAXIM.

Represented by.....16. *R. dauricum* var. *mucronulatum*

16. **Rhododendron dauricum** var. **mucronulatum** Maximowicz in Mém. Acad. Sci. St. Pétersb. sér. 7, XVI. no. 9, 44 (Rhod. As. Or.) (1870).—Wilson in Jour. Arnold Arb. IV. 50 (1923) where references to the synonymy and literature and a full account of this plant are given. A synonym not cited in my account of this variety is:

Rhododendron Argyi Léveillé in Fedde, Rep. Spec. Nov. XII. 102 (1913); in Mem. Acad. Cien. Art. Barcelona, no. 22, 10 (Cat. Pl. Kiangsou) (1916).

In the summer of 1920, I saw Léveillé's type preserved in Herb. Edinburgh and identified it as *R. dauricum* var. *mucronulatum* Maxim. In March of this year at my request Professor W. Wright Smith examined the specimen and is in complete agreement with my identification. As far as I can make out the place where this plant was collected is between Nanking and Soochow and I strongly suspect that it came from a garden. If it was a spontaneous plant this would be several hundreds of miles south of the known habitat of Maximowicz's plant.

SUBGEN. II. AZALEASTRUM PLANCH.

SECT. I. EUAZALEASTRUM WILS.

KEY TO THE SPECIES

Corolla rotate

Stamens 5.....17. *R. ovatum*
Stamens 10.....18. *R. ellipticum*

17. **Rhododendron ovatum** Planchon in Rev. Hort. 1854, 43.—Wilson in Jour. Arnold Arb. V. 103 (1924), where references and synonymy and a full account of the species are given. A synonym of this species not recorded in my account is:

Rhododendron lamprophyllum Hayata, Icon. Pl. Formos. III. 135 (1913).—Kanehira, Formos. Trees, 319, fig. 8, 321 (1917).

Hayata based his species on specimens collected by Messrs. T. Kawakami and U. Mori on Mt. Randai in August, 1908. He describes the capsule as "ovoideo-ellipsoidea, 8 mm. longa, 5½ mm. lata." This is slightly larger than any fruit I have seen of *R. ovatum* Planch. from continental Asia. Thanks to the courtesy of R. Kanehira I have a fragment of Hayata's type specimen and I can see nothing to distinguish it from the well-marked and widely distributed *R. ovatum* Planch.

18. **Rhododendron ellipticum** Maximowicz in Bull. Acad. Sci. St. Pétersb. sér. 3, XXXII. 497 (Mél. Biol. XII. 742) (1888).—Hemsley in Jour. Linn. Soc. XXVI. 22 (1889).—Millais, Rhodod. 158 (1917).

A glabrous bush. Leaves coriaceous, elliptic, 6–9 cm. long, 2.2–4.5 cm. broad, short-apiculate, petiole 1.3–2 cm. long, glabrous. Flowers 1–2 in fascicles at the end of the shoot; pedicels glabrous, 2.5–3 cm. long, sheathed in imbricated lanceolate bud-scales; calyx nearly obsolete or with depressed hemispherical lobes; corolla pale rose-color, rotate, 6 cm.

across, 5-lobed, lobes oblong-obovate; stamens 10, shorter than the corolla, filaments densely paleaceous-tomentose on the lower half; pistil over-topping the stamens; stigma obconic.

Habitat: eastern China; exact locality unknown.

This species is unknown to me, neither have I seen any material which can be referred to it. According to Maximowicz it is most closely related to *R. ovatum* Planch. which is distinguished by having five stamens and glandular-pilose pedicels and much smaller leaves. Maximowicz, who is always very accurate in his descriptions, describes the corolla as rotate which is of course the shape of the corolla in *R. ovatum* Planch. The Liukiu plant collected by Tashiro which Maximowicz also refers to his *R. ellipticum* has a distinctly funnelform corolla with a narrow tube and spreading lobes. I can only imagine that the material was in poor condition and that he could not make out the shape of the corolla in the Liukiu plant now called *R. leiopodum* Hayata.

We do not know where *R. ellipticum* Maxim. was collected. There are no herbarium specimens of it in this country and so far I have been unable to discover that it has been seen by any subsequent explorer. Until this happens it must remain an obscure species.

Sect. II. CHONIASTRUM Franch.

KEY TO THE SPECIES

Corolla funnelform-campanulate
- Fascicles 1-flowered; leaves glabrous, coriaceous or subcoriaceous
  - Bud-scales pubescent; calyx ciliate ..... 19. *R. Tanakai*
  - Bud-scales glabrous; calyx not ciliate
    - Leaves ovate-lanceolate ..... 20. *R. Wilsonae*
    - Leaves oblong-lanceolate to oblong-oblanceolate
      - Leaves short-acuminate, venation prominently reticulate .. 21. *R. leiopodum*
      - Leaves long-acuminate, venation not prominently reticulate ..... 22. *R. Latoucheae*
- Fascicles several-flowered; leaves pubescent, membranous or chartaceous; petioles and pedicels densely bearded and glandular ..... 23. *R. Championae*

Rhododendron Tanakai Hayata, Icon. Pl. Formos. iv. 15 (1914).—Kanehira, Formos. Trees, 328 (1917).

Bush 2–5 m. or small tree 6 m. tall, with trunk 0.6 m. in girth; branches subverticillate, slender, rigid, glabrous; buds clustered, acute, bud-scales acute, clothed with short pale gray pubescence on outer side, ciliolate. Leaves glabrous, clustered at end of shoot, subverticillate, sub-coriaceous, lanceolate-oblong, 5–12 cm., usually 8–10 cm. long, 1.5–4 cm., usually 2.5–3.5 cm. wide, acute or short-acuminate, apiculate, base narrowed, cuneate, margin slightly recurved, upper surface lustrous dark green, lower pale green, secondary veins spreading, slightly ascending, branching; petiole glabrous, 1–1.8 cm. long, channelled above. Flowers fascicled, fascicles lateral about the end of shoots, 1-flowered; pedicels glabrous spreading, 2.5–3 cm. long; calyx discoid, with 5 minute, rounded, pectinate-ciliate teeth; corolla funnelform-campanulate, about 5 cm. long and

broad, deeply 5-lobed; tube narrow, lobes spreading, spathulate to obovate, obtuse or rounded and emarginate; stamens 10, shorter than corolla filaments papillose-pubescent in lower half, anthers oval; pistil overtopping stamens, shorter than corolla, glabrous, ovary cylindric, 0.8 cm. long, furrowed, glabrous, style filiform, thickened below the capitate stigma. Fruit dark brown, cylindric, 2–3.5 cm. long, furrowed, often crowned with remains of style; seeds shining brown, oblong, 1.5–2 mm. long, wingless, with slight prolongation of testa at apex and base.

Habitat: Formosa, Kagi province, Arisan, from 1650 to 2650 m. altitude.

From *R. leiopodum* Hayata, the other Formosan species of its group, this is distinguished by its pubescent winter-buds and by its pectinate-ciliate calyx. It is very local in distribution and so far known only from the Arisan region in central Formosa. I saw several large bushes and gathered specimens bearing old fruits but none in blossom. My description of the flowers is drawn from a co-type specimen. In my opinion its position as a species rests more on its pubescent winter-buds than on the characters set forth by Hayata.

On cliffs and among rocks I would call it fairly common in the forested regions on and around Arisan. It is a large bush, open in habit, with polished green leaves, crowded at the ends of the branches. It was discovered by Messrs. Hayata, Kanehira and Tanaka in April, 1914, but has not yet been introduced into cultivation.

20. **Rhododendron Wilsonae** Hemsley & Wilson in Kew Bull. Misc. Inform. 1910, 116.—Wilson in Jour. Arnold Arb. v. 106 (1924), where a full account of the species is found.

This rare species, first discovered in Hupeh, so far as is known, has the eastern limits of its distribution on the mountains of northern Kwangtung where it was discovered in 1917 by Rudolf Mell.

21. **Rhododendron leiopodum** Hayata, Icon. Pl. Formos. III. 136, t. 24 (1913).—Kanehira, Formos. Trees, 319, fig. 6, 322 (1917).

Rhododendron ellipticum Maximowicz in Bull. Acad. Sci. St. Pétersb. sér. 3, XXXII. 497 (in Mél. Biol. XII. 742) (1888), in part, as to the Yaeyama plant.—Tashiro in Tokyo Bot. Mag. III. 201 (1889).—Matsumura in Tokyo Bot. Mag. XII. 13 (1898); Ind. Pl. Jap. II. pt. 2, 459 (1912).—Makino in Tokyo Bot. Mag. XVIII. 47 (1904); Icon. Fl. Jap. I. pt. 3, 15, t. 9 (1906).—Hayata in Jour. Coll. Sci. Tokyo, XXV. art. 19, 152 (Fl. Mont. Formos.) (1908).—Not Maximowicz, as to the type.

Rhododendron leptosanthum Hayata, Icon. Pl. Formos. III. 137 (1913).—Kanehira, Formos. Trees, 319, fig. 2, 323 (1917).

Rhododendron leptanthum Komatsu in Matsumura, Icon. Pl. Koisikav. II. 93, t. 131 (1915).—Not F. Mueller.

Bush 2–6 m. tall, with slender rigid verticillate glabrous branches; winter-buds clustered, acute, glabrous, bud-scales ciliolate. Leaves glabrous, clustered at end of shoot, subverticillate, sub-coriaceous, oblanceolate-oblong to oblong-lanceolate, 6–12 cm. long, 2–4.5 cm. wide, acute or short-acuminate, mucronulate, base narrowed, cuneate, upper surface lustrous dark green, lower pale green to pallid, secondary veins

spreading, almost at right angles or very slightly ascending, branching; petiole 0.5–1.5 cm. long, glabrous. Flowers in fascicles clustered round end of shoot, fascicles lateral, 1-flowered; pedicels 2.5–3.5 cm. long, glabrous; calyx glabrous, annular, 5-toothed, teeth unequal and variable, triangular and acute or membranous and elongated (oblong), 2–4 mm. long; corolla apparently pink, funnelform-campanulate, about 5.5 long and broad, deeply 5-lobed, tube narrow, lobes spathulate to obovate, rounded; stamens 10, rather shorter than corolla, filaments flattened and villose in lower half; anthers oval; pistil glabrous, equaling the stamens in length, ovary cylindric, 0.8–1 cm. long, furrowed, style moderately stout, stigma capitate. Fruit not seen.

Habitat: Liukiu Islands, Yaeyama. Formosa, woodlands from 160 to 2666 m. altitude.

This species is distinguished from the closely related *R. Tanakai* Hayata by its glabrous winter-buds and calyx and by its rather smaller flowers. The species, however, are very near kin. In Formosa *R. leiopodum* Hayata is found scattered through the mixed hardwood forests from a few hundred feet above sea-level in the north to an altitude of 8000 ft. in the south. On Arisan in the central part of the island it grows in rocky places in the Chamaecyparis and Tsuga forests. Though wide-spread it is nowhere common. It is a large bush or even small tree with long rigid branches and of rather open habit. I saw it growing in many places but neither in flower nor fruit. My description is drawn from flowering specimens collected on Arisan and at Uraisha in Taihoku province by S. Sasaki. The variation in size of the calyx is marked but this phenomenon is found among other members of its class and also in other species widely removed. Hayata emphasizes the pallid under surface of the leaves but I find this inconstant.

This species was discovered on Yaeyama, the southernmost large island of the Liukiu Archipelago, by Y. Tashiro in 1887. Maximowicz had some of the material and considered it the same species as one from western Fokien. On this mixed material is based *R. ellipticum* Maxim. but the description, mainly at least, is based on the Chinese plant which unfortunately is not represented in any herbarium in this country. It may be that Maximowicz was correct in his view but the floras of Formosa and eastern China are not closely related, the affinity being in the western part of China. On this ground I think it safer to accept Hayata's name for the insular species.

Hayata based his *R. leiopodum* on material collected on Bahozan in Bioritzu Prefecture by Messrs. T. Kawakami and U. Mori in 1906. On the mountains of Ako Prefecture, in the south of Formosa, T. Kawakami in 1907 collected other material. On this Hayata based his *R. leptosanthum*, which he distinguishes by its having smaller flowers and ovate-oblong leaves. I have before me a specimen of this plant named by Hayata, and can find no difference between it and material I have of typical *R. leiopodum*.

22. **Rhododendron Latoucheae** Franchet in Bull. Soc. Bot. France, XLVI. 210 (1899).—Millais, Rhodod. 200 (1917); II. 171 (1924).

A shrub with rigid twiggy gray and glabrous branches. Leaves crowded at end of shoot, semi-verticillate, rigid, coriaceous, glabrous, oblong-oblanceolate to oblong-lanceolate, 7–10 cm. long, 1.5–3 cm., usually 2–2.5 cm. broad, long-acuminate, base narrowed, cuneate, upper surface dark lustrous green, lower pallid, costa impressed above, prominent below; petiole rigid, 0.8–1.2 cm. long. Flowers clustered at end of shoots in 1-flowered lateral fascicles; pedicel glabrous, encased in semi-persistent paleaceous concave imbricated acute glabrous ciliolate bud-scales; calyx annular, glabrous, minutely 5-toothed, teeth sometimes irregular in size, up to 3 mm. long; corolla funnelform-campanulate, 3.5–4.5 cm. long and wide, very deeply 5-lobed, tube narrow, about 1 cm. long, lobes spreading, oblong-ovate to spathulate, rounded, often short-apiculate; stamens 10, of very unequal length, longest slightly exceeding corolla, filaments flattened and villose at base, anthers oval; pistil glabrous, overtopping stamens, exserted, ovary cylindric, about 0.8 cm. long, furrowed, style filiform, curving, slightly thickened below the capitate obscurely lobed stigma. Fruit not seen.

Habitat: southeastern China, Fokien province.

A very glabrous species distinguished by its narrow rigid coriaceous caudate leaves with deeply impressed costa and immersed secondary nerves, its 1-flowered lateral fascicles, the pedicels sheathed in paleaceous bud-scales, and by the deeply lobed corolla, villose filaments and glabrous pistil. The calyx teeth are sometimes elongated and as much as 3 mm. long, a phenomenon known among other species of the same group. It is evidently a very elegant plant most closely related to *R. Wilsonae* Hemsl. and Wils. which has broader ovate-lanceolate leaves and shorter genitalia.

This species is unknown to me in a living state but I have a photograph of the type specimen in Herb. Paris and four sheets on loan from Herb. Edinburgh and collected by J. de La Touche. The thick narrow caudate-acuminate leaves with deeply impressed midrib are striking.

23. **Rhododendron Championae** Hooker in Bot. Mag. LXXVII. t. 4609 (1851).—Bentham in Hooker, Jour. Bot. Kew Gard. Misc. IV. 299 (1852); Fl. Hongk. 200 (1861).—Maximowicz in Mém. Acad. Sci. St. Pétersb. sér. 7, XVI. no. 9, 33 (Rhodod. As. Or.) (1870).—Hemsley in Jour. Linn. Soc. XXVI. 21 (1889).—Bean in Flora & Sylva, III. 163 (1905).—Dunn & Tutcher in Kew Bull. Misc. Inform. add. ser. X. 155 (Fl. Kwangtung & Hongk.) (1912).—Millais, Rhodod. 141 (1917); II. 107 (1924).

Bush about 2 m. tall, branches moderately stout, rigid, glandular-hirsute in the first year; bud-scales ciliolate, outer pubescent, inner glandular. Leaves crowded at ends of shoots, strongly veined, membranous, oblong-lanceolate, 5.5–16 cm., usually 8–12 cm. long, 2.5–5 cm. usually 3–4 cm. wide, acute, mucronulate, base cuneate, rarely rounded,

ciliate, upper surface dark green, scabrid, lower pale to gray green, clothed with soft appressed hairs, costa and secondary veins impressed on upper, raised and hispid on lower surface, secondary veins spreading at right angles, branching; petioles 0.8–2 cm. long, bearded with stiff gland-tipped hairs. Flowers 4 to several in clustered lateral fascicles; pedicels stout, 1.5–2 cm. long, densely clothed with rufous brown pilose hairs many of them gland-tipped; calyx membranous, pilose, saucer-shaped, deeply 5-toothed, teeth unequal, triangular or lance-shaped, 0.2–0.8 cm. long, acute, ciliate; corolla pink, funnelform-campanulate, 5–8 cm. long and wide, deeply 5-lobed, tube narrow, 1.5–2.5 cm. long; lobes spathulate, usually rounded; stamens 10, shorter than corolla, filaments slender, papillose in lower half; pistil overtopping stamens, nearly as long as corolla, ovary ovoid, rather less than 0.5 cm. long, densely clothed with appressed rufous-brown pilose often gland-tipped hairs, style glabrous, stigma capitate. Fruit rostrate, cylindric, 4.5–7 cm. long, about 0.5 cm. wide, furrowed, with remains of style forming prominent beak, scabrid, with few scattered stipitate glands, pedicel curving.

Habitat: eastern China, southeastern Chekiang, Fokien and Hongkong.

This is a very distinct Rhododendron with thin oblong-lanceolate strongly veined leaves with soft pubescence and often gray on the lower surface, ciliate margins, bearded petioles, shoots and pedicels and long cylindric scabrid fruit. It was this first Rhododendron species discovered wild in China being found at Fort Victoria, Hongkong in 1849 by Captain J. G. Champion who sent seeds to Kew and after whose wife it is named. For many years it was considered endemic in Hongkong but in 1905 it was found in Fokien province by S. T. Dunn and quite recently in the southeast corner of Chekiang province. However, it appears to be a rare plant. It is tender and has never become common in gardens.

Subgen. III. ANTHODENDRON Endl.

Sect. I. TSUTSUTSI G. Don

KEY TO THE SPECIES

Bud-scales not viscid; shoots densely clothed with flattened, appressed hairs.
- Corolla funnelform-campanulate.
  - Stamens 5.
    - Filaments and style glabrous; anthers apiculate.....24. *R. breviperulatum*
    - Filaments and style villose; anthers not apiculate.....25. *R. Sasakii*
  - Stamens 7 to 10.
    - Leaves linear-lanceolate to lanceolate or oblanceolate.
      - Leaves crenate-dentate; style villose.....26. *R. Kanehirai*
      - Leaves entire; style glabrous.....27. *R. hainanense*
    - Leaves oval to obovate or lanceolate.
      - Style villose at base; corolla pink.
        - Leaves conspicuously dimorphic, obovate to obovate-oblong, abruptly mucronate.....28. *R. lasiostylum*
        - Leaves not conspicuously dimorphic, often widest below the middle, elliptic-ovate to ovate-oblong or elliptic to elliptic-oblong, acute 29. *R. rubropilosum*

Style glabrous; corolla red, rarely white or pink.
Flowers more than 2.5 across.
Leaves elliptic to elliptic-oblong or oblong-obovate, from 2 to 5 cm. long.....30. *R. Simsii*
Leaves oval to ovate-lanceolate, 1 to 2 cm. long.31. *R. longiperulatum*
Flowers less than 2.5 cm. across; leaves oblanceolate to oval, 1 cm. or less long.....32. *R. Nakaharai*
Corolla with short or long cylindric tube and spreading lobes; stamens 5.
Style villose at base; corolla white to rose-color.....33. *R. Seniavinii*
Style glabrous; corolla lilac-colored, with a long tube.....34. *R. Mariae*
Bud-scales viscid on inner surface; corolla wide-funnelform.
Corolla white; shoots and petioles clad with pilose non-glandular hairs 35. *R. boninense*
Corolla red.
Shoots and petioles clad with pilose often gland-tipped hairs; leaves not conspicuously dimorphic, entire.....36. *R. Oldhamii*
Shoots and petioles not pilose nor glandular; leaves conspicuously dimorphic, subcrenulate.....37. *R. scabrum*

24. **Rhododendron breviperulatum** Hayata, Icon. Pl. Formos. III. 129 (1913).—Kanehira, Formos. Trees, 318, 319, fig. 16 (1917).—Komatsu in Tokyo Bot. Mag. XXXII. (14) (1918).

A much-branched shrub, branches slender rigid, clothed with flattened shining brown appressed strigose hairs. Leaves chartaceous, clothed with scattered appressed-pilose hairs shining brown changing to gray, scattered and clustered, ovate-elliptic to oblong-obovate, 2–3 cm. long, 1–1.5 cm. wide, obtuse, callose-mucronulate, base narrowed, dark green above, paler below, costa impressed on upper surface, venation reticulate; petiole 0.3–0.5 cm. long. Flowers 3 to several in terminal fascicles, pedicels 0.4–0.6 cm. long, with calyx and ovary clothed with shining brown flattened pilose hairs; calyx minute, 5-lobed, lobes membranous ovate, 1–1.5 mm. long, ciliate; corolla funnelform, about 1.5 cm. long, 5-lobed; stamens 5, shorter than corolla, filaments flattened, glabrous or virtually so, anthers oblong, 1.5 mm. long, apiculate at base; pistil over-topping stamens, ovary conic, densely pilose, style glabrous except at extreme base, filiform, dilated below capitate stigma. Fruit not seen.

Habitat: Formosa, mountains of Nanto and Giran prefectures.

This Azalea is distinguished from other Formosan species by its small flowers, each with 5 stamens, with glabrous, or virtually so, filaments and anthers distinctly apiculate at the base. It is most closely related to *R. rubropilosum* Hayata which has rather larger flowers each with 7 or 8 stamens with villose filaments, non-apiculate anthers and a markedly pilose style, the leaves, moreover, are thicker and the costa more densely clad with hairs in *R. rubropilosum* Hayata. When working on my Monograph of Azaleas I had only the original description to guide me and confused *R. breviperulatum* Hayata with a much larger flowered plant which I now consider a new and distinct species and have named *R. Sasakii*. Hayata gives Mt. Pusasai in Nanto prefecture as the type locality. Material kindly supplied by R. Kanehira from the Government herbarium of Formosa and marked "co-type" is localized as Mt. Egiri,

near Giran. U. Mori in April, 1909, is given as the collector in both instances. On my visits to Formosa I did not see this Azalea; it is not in cultivation.

25. **Rhododendron Sasakii,** sp. nov.[1]

Rhododendron breviperulatum Wilson in Wilson & Rehder, Monog. Azal. 28 (1921).—Not Hayata.

A laxly branching shrub 2 m. tall, branches slender, rigid, clothed with appressed, flattened, dark red-brown strigose hairs; bud-scales non-glandular, outer sparsely pubescent, inner densely clothed with shining chestnut-brown pilose hairs. Leaves scattered and crowded, oblanceolate to oblong-lanceolate and ovate-lanceolate, 1–3 cm., usually about 2 cm.) long, 0.5–1 cm. wide, subacute, obtuse or rounded, mucronate, base narrowed, cuneate, rarely rounded, dark green above, both surfaces and petiole clothed with appressed pilose hairs gray-brown changing to gray, penninerved, costa impressed above; petiole 0.4–1 cm. long. Flowers 2 to several in terminal fascicles; pedicels 0.3–0.5 cm. long, with calyx densely clothed with appressed red-brown pilose hairs; calyx 5-lobed, lobes membraneous, oblong to oblong-ovate, 0.4–0.6 cm. long, ciliate; corolla red, wide-funnelform, 3–3.5 cm. long and broad deeply 5-lobed, lobes rounded or obtuse; stamens 5, nearly or quite as long as corolla, filaments villose in lower half, anthers oval, 1.5 mm. long; pistil slightly exserted, ovary conic, 2–3 mm. long, densely strigose, style filiform, with pale gray pilose hairs on lower half slightly dilated below capitate stigma. Fruit not seen.

Habitat: Formosa, Nanto province, Horisha, planted in hotel garden, said to have come from neighboring mountains, December 6, 1918, *E. H. Wilson*, no. 11206.

This new Azalea is easily recognized by its relatively large flowers, its 5 stamens with villose filaments and pilose style. It is most closely related to *R. Simsii* Planch. which has from 8 to 10 stamens. In my Monograph of Azaleas with only the description to guide me I had confused this new species with the small flowered *R. breviperulatum* Hayata.

[1] **Rhododendron Sasakii,** sp. nov. Frutex laxe ramosus, 2 m. altus; rami tenues, rigidi, pilis adpressis compressis intense rubro-brunneis strigosis vestiti; perulae eglandulosae, exteriores sparse pubescentes, interiores pilis lucidis castaneis dense vestitae. Folia sparsa et congesta, oblanceolata vel oblongo-lanceolata et ovato-lanceolata, 1–3, pleraque circiter 2 cm. longa et 0.5–1 cm. lata, subacuta, obtusa vel rotundata, mucronata, basi attenuata, cuneata, rarius rotundata, supra intense viridia, utrinque ut petioli pilis adpressis cinereo-brunneis demum cinereis vestita, penninervia, costa supra impressa; petioli 0.4–1 cm. longi. Flores 2 vel plures in fasciculis terminalibus; pedicelli 0.3–0.5 cm. longi ut calyx dense pilis adpressis rubro-brunneis vestiti; calyx 5-lobus, lobis membranaceis oblongis vel oblongo-ovatis 0.4–0.6 cm. longis ciliatis; corolla rubra late infundibuliformis, 3–3.5 cm. longa ac lata, profunde 5-loba lobis rotundatis vel obtusis; stamina 5, corollam aequantia vel fere aequantia, filamentis infra medium villosis, antheris ovalibus 1.5 mm. longis; pistillum leviter exsertum, ovario conico 2–3 mm. longo dense strigoso, stylo filiformi pilis pallide cinereis infra medium vestito infra stigma capitatum leviter dilatato. Fructus non visus.

26. **Rhododendron Kanehirai** Wilson in Wilson & Rehder, Monog. Azal. 28 (1921), where a full account of the species is given.

27. **Rhododendron hainanense** Merrill in Philip. Jour. Sci. XXI. 350 (1922).

Shrub with many erect twiggy branches clothed with appressed brown strigose hairs. Leaves subcoriaceous, linear-lanceolate, 2–3.5 cm. long, 0.3–1 cm. broad, acute, mucronate, base cuneate, upper surface dark green with impressed costa and secondary nerves; lower surface subglaucous with prominent costa and secondary nerves, and few scattered appressed hairs; petiole flattened, 0.3–0.5 cm. long, clothed with appressed gray-brown hairs. Flowers 1–3 in terminal fascicles; pedicels erect, 0.5–1.5 cm. long, densely clothed with appressed-strigose hairs; calyx deeply 5-lobed, lobes ovate-lanceolate, 0.3–0.5 cm. long, rounded or acuminate, ciliate, densely pilose; corolla red, funnelform, 3–4 cm. long, 2.5–4 cm. broad, deeply 5-lobed, lobes spreading, acute or obtuse; stamens 10, unequal, shorter than corolla, filaments pilose in the basal half; pistil exceeding the stamens; ovary ovoid, densely pilose, style filiform, glabrous, stigma capitate. Fruit ovoid, 0.6 cm. long, glabrescent.

Habitat: eastern China, Hainan.

This is a very distinct species well-characterized by its narrow linear-lanceolate, acute leaves sub-glaucous on the underside and by its large calyx lobes. It is most closely related to *R. Nakaharai* Hayata which has oblanceolate to oval leaves. It is also related to *R. Kanehirai* Wils. which has dimorphic linear-lanceolate leaves with obscurely crenate-serrate margins. I have seen a co-type specimen and through the courtesy of Prof. E. D. Merrill I have the loan of a specimen collected by Miss Schaeffer on a second occasion but probably from the same plant that yielded the actual type specimen.

This is a very interesting addition to the Chinese species of the section Tsutsutsi. It was discovered in January, 1921, by Miss K. L. Schaeffer but has not yet been introduced into cultivation.

28. **Rhododendron lasiostylum** Hayata, Icon. Pl. Formos. III. 135 (1913).—Wilson in Wilson & Rehder, Monog. Azal. 50 (1921), where complete references and synonymy and a full account of the species are given.

29. **Rhododendron rubropilosum** Hayata in Jour. Coll. Sci. Tokyo, XXX. art. 1, 173 (Mat. Fl. Formos.) (1911).—Wilson in Wilson & Rehder, Monog. Azal. 52 (1921), where references, synonymy and a full account of the species are given.

A synonym of this Formosan species overlooked in my Monograph is *Rhododendron randaiense* Hayata, Icon. Pl. Formos. VI. suppl. 43 (1917), name only.

30. **Rhododendron Simsii** Planchon in Fl. des Serr. IX. 78 (1854).—Wilson in Wilson & Rehder, Monog. Azal. 45 (1921), where complete references and synonymy and a full account of the species are given.

Rhododendron Simsii var. **eriocarpum** Wilson in Wilson & Rehder, Monog. Azal. 49 (1921), where a full account is given. In his Trees and Shrubs of Japan (I. 97, fig. 53. 1922) and in the Tokyo Bot. Mag. (XXXVIII. 27. 1924) Nakai has raised this plant to specific rank designating it *R. eriocarpum* Nakai.

31. **Rhododendron longiperulatum** Hayata, Icon. Pl. Formos. III. 138 (1913).—Kanehira, Formos. Trees, 319, fig. 13, 323 (1917).—Komatsu, in Tokyo Bot. Mag. XXXII. 14 (1918).

Shrub with numerous twiggy branches, densely clothed with flattened appressed chestnut-brown strigose hairs. Leaves homomorphic, scattered, short-petioled, chartaceous, ovate to ovate-lanceolate, 1–2 cm. long, 0.5–1 cm. wide, mucronate, base cuneate, obscurely crenulate, upper surface dark green, lower pale green, with scattered rufous appressed strigose hairs on both surfaces; petiole 1–2 mm. long. Flowers umbellate, 2–3; pedicels stout, 1 cm. long with calyx and ovary densely clothed with shining rufous strigose hairs; calyx discoid, with 5 acute teeth each 2–3 mm. long; corolla red, funnelform-campanulate, about 3 cm. long and broad, deeply 5-lobed, lobes spreading, rounded; stamens 10, unequal, slightly shorter than corolla, filaments papillose in lower half, anthers dark, ovoid, 1–1.5 mm. long; pistil overtopping stamens, equaling corolla, ovary ovoid, 2–3 mm. long, style filiform, curving, glabrous or nearly so, stigma capitate. Fruit oblong-ovoid, about 7 mm, long, strigose.

Habitat: Formosa, Taihoku prefecture, Mt. Daiton and Hokuto.

This Azalea is most closely related to *R. Kanehirai* Wils. which is distinguished by its subverticillate branches, its more crowded, much longer, more membranous leaves and by its larger flowers with exserted style. In my Monograph of the Azaleas of the Old World I wrongly referred *R. longiperulatum* Hayata to *R. Oldhamii* Maxim. as a synonym, with which species I now find it has nothing to do. Indeed, Hayata's species with its neat scattered nearly oval subcoriaceous leaves pallid on the under surface is quite distinct from all of its group. *Rhododendron longiperulatum* Hayata was discovered on Mt. Daiton by Y. Shimada in 1910; it is not in cultivation.

32. **Rhododendron Nakaharai** Hayata in Jour. Coll. Sci. Tokyo, XXV. art. 19, 153 (Fl. Mont. Formos.) (1908).—Millais, Rhodod. 216 (1917).—Kanehira, Formos. Trees, 319, fig. 15, 325 (1917).—Komatsu in Tokyo Bot. Mag. XXXII. 14 (1918).—Wilson in Wilson & Rehder, Monog. Azal. 54 (1921).

Rhododendron serpyllifolium Hayata in Tokyo Bot. Mag. XX. 72 (1906).—Not Miquel.

An intricately branched shrub, branches twiggy, rigid, clothed with shining brown flattened appressed strigose hairs. Leaves scattered, numerous, oblanceolate to oval, 0.6–1 cm. long, 0.3–0.5 cm. wide, obtuse or subacute, mucronulate, base narrowed, margin slightly recurved,

upper surface dark green, lower pale green, both surfaces and petiole clothed with shining brown appressed strigose hairs; petiole 1–2 mm. long. Flowers 2–3 in terminal fascicles; pedicels erect, 3.5 mm. long, with calyx and ovary densely clothed with shining brown flattened pilose hairs; calyx a mere rim with 5 membranous lobes, lobes oval to ovate, 2 mm. long, ciliate; corolla dark red, funnelform-campanulate, 2 cm. long, 5-lobed, tube villose at base within, lobes obovate, rounded; stamens 10, about half the length of corolla, filaments villose below mid-length, anthers oblong, 2 mm. long, dark colored; pistil slightly exceeding stamens in length, ovary conic, about 2 mm. long, densely pilose, style glabrous, stigma nearly simple. Fruit not seen.

Habitat: Formosa, Mt. Shichisei in Taihoku province.

When working on my Monograph of Azaleas of the Old World I had seen only the type material preserved in the Tokyo Herbarium and accepted Hayata's view of the relationship of this species. I am now in possession of a specimen collected on Mt. Shichisei by S. Sasaki in May, 1924, from which I have drawn a fuller description. I now think this plant is most closely related to *R. obtusum* Planch. and more especially to the form *japonicum* Wils. which, however, is easily distinguished by its dimorphic leaves and its flowers with 5 stamens. *R. Nakaharai* Hayata is a low much-branched twiggy shrub with very small leaves and deep red flowers with 10 stamens. It was discovered on Mt. Shichisei in July 1905 by G. Nakahara; it is not in cultivation.

33. **Rhododendron Seniavinii** Maximowicz in Mém. Acad. Sci. St. Pétersb. sér. 7, XVI. no. 9, 33, t. 3, fig. 21–24 (Rhodod. As. Or.) (1870).—Wilson in Wilson & Rehder, Monog. Azal. 57 (1921), where complete references and synonymy and a full account of the species are given.

34. **Rhododendron Mariae** Hance in Jour. Bot. XX. 230 (1882).—Wilson in Wilson & Rehder, Monog. Azal. 58 (1921), where complete references and synonymy and a full account of the species are given.

35. **Rhododendron boninense** Nakai in Tokyo Bot. Mag. XXXIV. (324) (1920), name only; XXXV. 152 (1921).

A much-branched wide-spreading shrub 2 m. tall branches relatively stout densely clothed with appressed rufous strigose hairs; outer bud-scales clothed with appressed rufous pilose hairs inner villose and glandular on inner surface. Leaves abundant, scattered, homomorphic, chartaceous, oblong-oblanceolate to oblong-lanceolate, 2.5–4.5 cm. long, 0.8–1.2 cm. wide, subacute, mucronulate, base narrowed, cuneate, dark green, upper surface sparsely, lower and petiole densely clothed with appressed rufous pilose hairs, costa and secondary veins impressed above; petiole 0.5–1.2 cm. long, channelled above. Flowers fascicled, 4–6, subtended by semipersistent bud-scales; pedicels 0.5–1 cm. long with calyx and ovary densely clothed with rufous appressed-strigose hairs; calyx discoid, with 5 minute acute or rounded teeth; corolla white,

funnelform-campanulate, 4–5 cm. long and broad, 5-lobed, lobes ascending-spreading, spathulate to obovate, rounded or obtuse; stamens 10, shorter than corolla, filaments papillose in lower half, anthers pale, sub-globose; pistil nearly as long as corolla, over-topping stamens, ovary ovoid, style filiform, pilose in lower half, stigma capitate. Fruit oblong-ovoid, 1.5–1.8 cm. long, densely clothed with gray brown, pilose hairs; pedicel stout 1–1.5 cm. long, pilose.

Habitat: Bonin Islands.

This is a well-marked endemic species characterized by its large white flowers, by the long shaggy rufous-gray hairs on shoot and petioles and by its crowded, scattered homomorphic leaves. It is related to *R. mucronatum* G. Don which is distinguished by its glandular-pubescent calyx and gland-tipped hairs scattered on both surfaces of the leaf. The Bonin Azalea is evidently a very beautiful plant. It is known only from one mountain on the island of Chichishima, the largest of the Bonin group, where it was discovered in 1920 by Messrs. T. Nakai and H. Toyoshima. The habitat is said to be difficult of access and only one group of plants were found. Through Dr. Nakai's assistance Mr. H. Toyoshima sent seed to the Arnold Arboretum in the autumn of 1924 and these have been distributed among friends in America and England.

31. **Rhododendron Oldhamii** Maximowicz in Mém. Acad. Sci. St. Pétersb. sér. 7, xvi. no. 9, 34 (Rhodod. As. Or.) (1870).—Wilson in Wilson & Rehder, Monog. Azal. 67 (1921), where complete references and synonymy and a full account of the species are given.

37. **Rhododendron scabrum** G. Don. Gen. Syst. iii. 846 (1834).—Wilson in Wilson & Rehder, Monog. Azal. 59 (1921), where complete references and synonymy and a full account of the species are given.

Sect. II. SCIADORHODION Rehd. & Wils.

KEY TO THE SPECIES

Leaves ovate; corolla pale lilac-purple; stamens 8 to 10; fruit conic-ovoid on a curved pedicel ..... 38. *R. Farrerae*

Leaves ovate to ovate-lanceolate; corolla rose-color; stamens 10; fruit short-cylindric, erect ..... 39 *R. Mariesii*

38. **Rhododendron Farrerae** Tate apud Sweet, Brit. Flow. Gard. ser. 2, i. t. 95 (1831).—Wilson in Wilson & Rehder, Monog. Azal. 79 (1921), where complete references and synonymy and a full account of the species are given.

39. **Rhododendron Mariesii** Hemsley & Wilson in Kew Bull. Misc. Inform. 1907, 244.—Wilson in Wilson & Rehder, Monog. Azal. 80 (1921), where complete references and synonymy and a full account of the species are given.

SECT. III. PENTANTHERA G. DON.

Represented by.....40. *R. molle*

40. **Rhododendron molle** G. Don, Gen. Syst. III. 846 (1834).—Wilson in Wilson & Rehder, Monog. Azal. 95 (1921), where complete references and synonymy and a full account of the species are given.

JOSEPH BANKS: ICONES SELECTÆ PLANTARUM QUAS IN JAPONIA COLLEGIT ET DELINEAVIT ENGELBERTUS KAEMPFER

T. NAKAI

This publication edited in 1791 contains 59 figures of Japanese plants of which 32 have scientific names and 18 have only Japanese names, the rest have no names at all. According to modern nomenclature the names of the plants figured are as follows:

	Names given by Banks	Names determined by Nakai
1.	Amomum Mioga Thunberg.	Zingiber mioga Roscoe
2.	Limodorum striatum Thunberg.....	Calanthe striata R. Brown
3.	Limodorum ensatum Thunberg.....	Cymbidium ensifolium Swartz
4.	Ficus erecta Thunberg.....	Ficus erecta Gedner (1786)
5.	Skimmia japonica Thunberg.....	Skimmia japonica Lodin (1783)
6.	Aucuba japonica Thunberg.	Aucuba japonica Lodin (1783)
7.	Bladhia crispa Thunberg...	Bladhia crispa Thunberg
8.	Evonymus japonica Thunberg.....	Evonymus japonica Thunberg
9.	Paederia foetida Thunberg (non Linnaeus).....	Paederia chinensis Hance
10.	Aralia japonica Thunberg..	Fatsia japonica Morren & Decaisne
11.	Hemerocallis japonica Thunberg.....	Hosta caerulea Trattinick
12.	Orontium japonicum Thunberg.....	Rhodea japonica Roth.
13. 14.	Nandina domestica Thunberg.....	Nandina domestica Hornstedt (1781)
15.	Dioscorea quinqueloba Thunberg.....	Dioscorea septemloba Thunberg
16.	Daphne odora Thunberg..	Daphne odora Thunberg
17.	Quercus glauca Thunberg..	Quercus glauca Thunberg
18.	Mespilus japonica Thunberg.....	Eriobotrya japonica Lindley

19. Mimosa arborea Thunberg (non Linnaeus) ..... Albizzia julibrissin Durrazo.
20. Begonia obliqua Thunberg (non Linnaeus, L'Heritier, Jacquin) ..... Begonia Evansiana Andrews
21. Bignonia grandiflora Thunberg ..... Campsis chinensis Voss.
22. Clerodendron trichotomum Thunberg ..... Clerodendron trichotomum Thunberg
23. Dryandra cordata Thunberg ..... Aleurites cordata Steudel
24. Taxus macrophylla Thunberg ..... Podocarpus macrophylla G. Don
25. Dolichos ensiformis Thunberg ..... Dolichos lablab Linnaeus
26. Eupatorium album Thunberg ..... Eupatorium Lindleyanum DC.
27. } Tussilago japonica Thun-
28. } berg ..... Ligularia tussilaginea Makino (*Ligularia Kaempferi* Sieb. & Zucc.)
29. Aster hispidus Thunberg... Aster hispidus Thunberg
30. Inula japonica Thunberg... Inula japonica Thunberg
31. Pteris piloselloides Thunberg (non Linnaeus)..... Drymoglossum microphyllum Presl
32. Taraijo..... Ilex latifolia Thunberg
33. Sakaki..... Eurya ochnacea Szyszylowicz
34. Sjiroggi..... Ilex rotunda Thunberg
35. Namome..... Ilex Oldhami Miquel
36. Kuroggi..... Symplocos japonica A. DC.
37. Jamma mómu..... Myrica rubra Sieb. & Zucc.
38. Ssi no ki..... Lithocarpus cuspidata Nakai (*Pasania cuspidata* Oerstedt, *Castanopsis cuspidata* Schottky)
39. Natta mame..... Canavalia ensiformis DC.
40. Atsuki..... Phaseolus angularis S. F. Wight (Dolichos angularis Willdenow)
41. Kadsune..... Pueraria hirsuta Matsumura
42. Kobus..... Magnolia kobus DC.
43. Mokkwuren..... Magnolia denudata Desrousseaux
44. Mokkwuren..... Magnolia liliiflora Desrousseaux
45. Korei Utsugi..... Diervilla coreensis DC.
46. Sjire..... Lilium cordifolium Thunberg
47. Konokko Juri..... Lilium speciosum Thunberg
48. Ssugi..... Cryptomeria japonica G. Don
49. San Kakso..... Aristolochia Kaempferi Willdenow

50. .....Machilus Thunbergii Sieb. & Zucc.
51. .....Cinnamomum pedunculatum Nees
52. .....Neolitsea glauca Koidzumi
(*Litsaea glauca* Siebold)
53. .....Euscaphis japonica Pax
54. .....Trichosanthes cucumeroides Maximowicz
55. .....Rhododendron Kaempferi Planchon
56. .....Raphiolepis umbellata Makino
57. { fruit .....Euscaphis japonica Pax
leaves .....Clerodendron trichotomum Thunberg
58. Volkameria Kaempferi
Jacquin .....Clerodendron japonicum Makino
59. .....Parthenocissus tricuspidata Planchon

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CATALOGUE OF TREES GROWING NATURALLY IN THE VICINITY OF SARDIS, DALLAS COUNTY, ALABAMA

R. S. COCKS

The appended list of species and varieties of native trees amounting to about one hundred and thirty are all growing in the vicinity of Sardis, a small flag station on the Selma-Flomaton Railroad about eight miles from Selma on the south side of the Alabama River from which it is about two miles distant. With the exception of five or six trees which are noted in their respective places, all the others are growing on a small strip of land comprising about three hundred acres. The strip in question lies along the Alabama River for a distance of about three-fourths of a mile beginning at a high bluff known as Hatcher's Bluff perhaps three hundred and fifty feet high and ending at a landing known as Givhan's Landing where the bank is only a few feet above the river. It extends back from the river about half a mile at both north and south boundaries. The land is very hilly near the river gradually becoming flatter as one gets away from the river. It is traversed by three very winding creeks which just as is the case with the river, alternate with high limestone banks and no banks at all. The creeks join together and enter the river at Givhan's Landing. The majority of the trees here listed grow near the junction of the river and creeks. Both river and creeks are subject to huge floods rising sometimes as much as sixty or seventy feet, so that a large portion of the land is subject to overflow every two or three years. In the summer of 1915 the creeks which are normally a few feet wide and a few inches deep were large rivers fifty or sixty feet deep and only the tops of the trees on the banks were above the water. The whole strip was formerly an unbroken forest, but the trees are now all gone except a dense fringe along the creeks and the river. On account of the windings of the creeks, there are probably two miles of creek banks to a straight mile, just as by the river it is here eighteen miles to Selma, and by the road only eight.

This somewhat verbose description is an attempt to show that in this small space there is more room for trees than would be the case if it were not for the creeks with their high winding banks and the contour of the land. Probably eighty percent of all the trees of Alabama grow here, and what is perhaps still more remarkable, no less than twenty-six species

or well marked varieties of oaks can here be found in a half mile walk. All the identification of the trees listed have been verified by Professor Sargent, and specimens of most of them are in the Arnold Arboretum, collected mostly by myself, a few by Professor Sargent himself, who visited the region in the spring of 1916, and a few by Mr. Harbison. There is a full set in the herbarium of Tulane University.

PINACEAE.

Pinus palustris Mill.

Pinus taeda L.

Pinus glabra Walt.

Pinus echinata Mill.

With the exception of *P. glabra* the other pines are numerous. *Pinus taeda* especially is the common second growth on land which has been cleared and abandoned. *Pinus glabra* is rare, represented only by three or four trees on the high banks of creeks.

Taxodium distichum Rich. Very abundant on the low lands.

Taxodium ascendens Brongn. (*T. distichum* var. *imbricarium* Croom). Not uncommon on the banks of creeks.

Juniperus virginiana L. Very abundant on the dry hills.

SALICACEAE.

Populus heterophylla L. Two or three trees in the swamps near the river.

Populus balsamifera var. *virginiana* Sarg. Very common.

Salix nigra Marsh.

Salix spec. Along the gravelly banks of stream.

MYRICACEAE.

Myrica cerifera L. As a tree on the high bluffs of the river.

JUGLANDACEAE.

Juglans nigra L. Common.

Carya cordiformis K. Koch. Two or three trees only.

Carya aquatica Nutt. Very common along the streams.

Carya myristicaeformis Nutt. This rather rare Hickory is fairly abundant throughout this region and in the surrounding country.

Carya ovata K. Koch.

Carya carolinae-septentrionalis Engl. & Graebn. Common, as is the preceding.

Carya laciniosa Loud. A large number of trees on the alluvial banks of the river and creeks subject to overflow.

Carya alba K. Koch. Very common.

Carya alba var. *subcoriacea* Sarg. The variety occurs on the low river banks.

Carya pallida Engl. & Graebn. This is the common Hickory in this region especially on the dry hills.

BETULACEAE.

Carpinus caroliniana Walt.

Ostrya virginiana K. Koch.

Betula nigra L. On the banks of the river; rare.

FAGACEAE.

Fagus grandifolia Ehrh. Abundant.

Fagus grandifolia var. *caroliniana* Fern. and Rehd.

Castanea dentata Borkh. Originally very abundant, now becoming scarce on account of the death of many of the trees.

Castanea pumila Mill. Very abundant, often 40–50 feet high.

Castanea alnifolia var. *floridana* Sarg. Several trees of this species 30–40 feet high.

Quercus borealis var. *maxima* Ashe. Several very fine representatives of this species.

Quercus Shumardii Buckl. Very common.

Quercus Shumardii var. *Schneckii* Sarg. Very common.

Quercus coccinea var. *tuberculata* Sarg. Bluffs of the Alabama River. (Type; see Bot. Gaz. LXV. 426 [1918].)

Quercus velutina Lam. Common.

Quercus Catesbaei Mich. Common.

Quercus rubra L. Very abundant. The var. *triloba* Ashe is not uncommon.

Quercus rubra var. *pagodaefolia* Ashe. Very abundant.

Quercus marilandica Muenchh. Very abundant especially as second growth on cultivated ground that has been abandoned.

Quercus nigra L. Common.

Quercus obtusa Ashe (*Q. rhombica* Sarg.) Common.

Quercus phellos L. Common.

Quercus laurifolia. Common.

Quercus cinerea Mich. Very abundant.

Quercus Durandii Buckley. Common. Occasionally a very large tree over a hundred feet high.

Quercus lyrata Walt. Common.

Quercus stellata Wang. Very abundant.

Quercus stellata var. *Margaretta* Sarg. Common.

Quercus stellata var. *Margaretta f. stolonifera* Sarg. A small shrub forming dense thickets.

Quercus austrina Small. Common along the creeks.

Quercus alba L. Common.

Quercus alba var. *latiloba* Sarg. Common.

Quercus Prinus L. Common.

Quercus Muehlenbergii Engelm. Rare.

Quercus subintegra Trel. A hybrid supposedly of *Q. cinerea* and *Q. rubra*. This is a most striking tree with large unlobed leaves, glossy above and densely stellate pubescent beneath. Several trees.

Quercus Bushii Sarg. A hybrid supposedly of *Q. marylandica* and *Q. velutina*. Several trees.

ULMACEAE.

Ulmus americana L. Common.

Ulmus alata Michx. Common.

Ulmus fulva Michx. Several trees.

Planera aquatica Gmel. A few trees near the river.

Celtis occidentalis var. *crassifolia* A. Gray. Common.

Celtis laevigata K. Koch. Very abundant.

MORACEAE.

Morus rubra L. Common.

MAGNOLIACEAE.

Magnolia virginiana L. Common. This is the only Magnolia actually in the tract described, but the following additional Magnolias can be found in the vicinity: *Magnolia grandiflora* L., *M. macrophylla* Michx., *M. pyramidata* Pursh.

Liriodendron Tulipifera L. Common.

LAURACEAE.

Persea Borbonia Spreng. Rare.

Sassafras officinale Nees and Eberm. Very common as a shrub, occasionally a large tree.

HAMAMELIDACEAE.

Liquidambar styraciflua L. Very common.

Hamamelis macrophylla Pursh. Very common as a shrub. A tree over 30 feet high on the high bluffs of the river.

PLATANACEAE.

Platanus occidentalis L. Very abundant.

ROSACEAE.

Malus angustifolia Michx. A few trees.

Amelanchier canadensis Med. Rare.

Crataegus. There are many species of Crataegus but very few of them here are really trees. The following might be so considered: *Crataegus apiifolia* Michx., *C. spathulata* Michx., *C. tomentosa* L., *C. algens* Beadle.

Prunus umbellata Ell. Very abundant.

Prunus lanata Mack. & Bush. Common.

Prunus Munsoniana Wight & Hedrick. A few trees.

Prunus angustifolia Marsh. Very abundant.
Prunus serotina Ehr. Common.
Prunus caroliniana Ait. Common.

LEGUMINOSAE.

Cercis canadensis L. Very abundant.
Gleditsia triacanthos L. Common.
Robinia Pseudoacacia L. Very common; probably naturalized.

RUTACEAE.

Xanthoxylum clava-Herculis L. A few trees.
Ptelea trifoliata L. Very common as a small shrub; along the creeks a tree 30 feet high.

ANACARDIACEAE.

Rhus copallina L. Usually a shrub, occasionally a tree 30 feet high and 8 to 10 inches trunk diameter.
Rhus vernix L. A small tree. Common.

CYRILLACEAE.

Cyrilla racemiflora L. Very common.

AQUIFOLIACEAE.

Ilex opaca Ait. Very common.
Ilex vomitoria Ait. Occasionally a small tree.
Ilex decidua Walt. Common.
Ilex monticola Gray. A small tree or large shrub. Rare.

ACERACEAE.

Acer saccharum Marsh. Rare.
Acer floridanum Pax. Common.
Acer leucoderme Small. Common.
Acer saccharinum L. Abundant in the lowlands along the river.
Acer rubrum L. A few trees.
Acer rubrum var. *tridens* Wood. Common.
Acer Negundo L. Very abundant.

HIPPOCASTANACEAE.

Aesculus Pavia L. Usually a small shrub; one or two arborescent specimens 25 feet high.

RHAMNACEAE.

Rhamnus caroliniana Walt. Very common.

TILIACEAE.

Tilia nuda Sarg. Common.
Tilia nuda var. *glaucescens* Sarg. Common.

Tilia floridana Ashe. Common.
Tilia floridana var. *oblongifolia* Sarg. A few trees.
Tilia heterophylla Vent. A few trees.
Tilia heterophylla var. *Michauxii* Sarg. A few trees.

ARALIACEAE.

Aralia spinosa L. Very common.

NYSSACEAE.

Nyssa sylvatica Marsh. Very common.
Nyssa biflora Walt. Very common.
Nyssa aquatica Marsh. A few trees.

CORNACEAE.

Cornus florida L. Very common.
Cornus asperifolia Michx. Common.

ERICACEAE.

Oxydendron arboreum D. C. Several trees on the high bluffs of the river.
Vaccinium arboreum Marsh. Very common.

SAPOTACEAE.

Bumelia lanuginosa Pers. Common.
Bumelia lycioides Gaertn. f. Common.

EBENACEAE.

Diospyros virginiana L. Very common.

STYRACACEAE.

Halesia diptera Ellis. Very common.—*Halesia carolina* L. has been collected in the near vicinity.

SYMPLOCACEAE.

Symplocos tinctoria L'Hér. Common.

OLEACEAE.

Fraxinus caroliniana Mill. Common.
Fraxinus americana L. Common.
Fraxinus pennsylvanica var. *lanceolata* Sarg. Common.
Forestiera acuminata Poir. One or two medium sized trees (40 ft.) along the river.
Chionanthus virginica L. Very common.

BIGNONIACEAE.

Catalpa bignonioides Walt. Common.

RUBIACEAE.

Cephalanthus occidentalis L. Common.

CAPRIFOLIACEAE.

Viburnum rufidulum Raf. Common.

IS QUERCUS ARKANSANA A HYBRID?

Ernest J. Palmer

In looking over Dr. Trelease's recently published monograph of the American Oaks[1] I note that *Quercus arkansana* Sargent is there treated as a hybrid, *Quercus marilandica* Muenchhausen and *Quercus nigra* Linnaeus being given as the parent species. As only a list of the hybrids is given without descriptive notes the author does not state the grounds upon which he arrives at this conclusion, although in a foot-note a statement from Dr. Roland M. Harper is quoted, in regard to an Oak collected by him in Pike County, Alabama, which has been referred to *Quercus arkansana*, and which Dr. Trelease also includes under the same hybrid parentage, to the effect that it does not there grow in association with *Quercus marilandica*, a circumstance which, as we shall see, is also largely paralleled in the Arkansas localities.

Since few botanists have had a chance to see this comparatively rare Oak growing in its native habitat or even to become acquainted with it through herbarium specimens, it may be worth while to give a brief résumé of the facts known regarding it.

Quercus arkansana was first found in Arkansas by Mr. B. F. Bush, in 1909, growing along Yellow Creek, a small tributary of Little River, near Fulton, or more exactly near the village of McNab, Hempstead County, and was described by Professor Sargent[2] from specimens collected there by Bush and later by himself. If the Alabama Oak is specifically identical, as I believe to be the case, its first discovery must be credited to Dr. Charles C. Mohr, who collected it along a small tributary of the Conecuh River in 1880, and it was he also who first suggested the theory that it was a hybrid between the species mentioned by Dr. Trelease. Dr. Mohr does not mention this Oak in his Plant Life of Alabama, nor does he appear to have published anything about it elsewhere.

Dr. Harper explored the Alabama locality in 1912 and published an interesting account of the flora,[3] including a foot-note on the Oak, which he regarded as an undescribed species. A sheet of the specimens collected by Mohr (no. 22, July 4, 1880. "Quercus.—aun [?] var. hybrid inter Q. aquatica et nigra. Arb. gracilis 20–24′ alt. trunco 2–3½″ diamet. glaber-

[1] Mem. Nat. Acad. Sci. xx. (1924).

[2] Trees & Shrubs, II. 121–122, pl. 152 (1911).

[3] The "pocosin" of Pike County, Alabama, and its bearing on certain problems of succession. (Bull. Torrey Bot. Club, xli. 209–220 [1914].)

rimo cinereo. In moist but sandy soil, wooded banks near Troy, on a tributary of Conecuh river.") with mature leaves and young fruit, is in the herbarium of the Arnold Arboretum, as are also a set of Harper's specimens (no. 152, Nov. 6, 1912, "In the 'pocosin' between Troy and Brundidge, Pike County."), with mature leaves and separate fruit; and a second collection (no. 154, March 27, 1913), showing young leaves and flowers, and a small photograph of the trunk. There is also in the same collection a series of specimens from the Arkansas stations by Bush, Sargent and Palmer.

In the original description of *Quercus arkansana* Sargent says that it is common at the type station but apparently very local. This statement still holds true, although on numerous visits to southwestern Arkansas during the past twelve years I have been able to extend its range somewhat locally, and it has been found to be much more common than was at first supposed. In addition to the localities on Yellow Creek it has been found along Bridge Creek, Sandy Bois d'Arc Creek and several other small tributaries of Little River and Red River.

The topography of this small area is peculiar and somewhat remarkable, consisting of low hills and sharp ridges dissected by deep ravines, evidently a relic of the old Tertiary peneplain projecting into the lowlands of the Red River valley. Sterile clays and gravels cover the higher levels of the low plateau and remain on the crests of some of the higher ridges; in the ravines and valleys of the small creeks which traverse it and on the slopes and lower levels along its margins, beds of fine loose sand interstratified with clays and a soft sandstone, passing into marly limestone, with large calcareous oyster shells and other typical Upper Cretaceous fossils, are exposed. In this restricted area, nearly surrounded by the stiff black alluvial lands of the river bottoms, which are subject to frequent overflows and are in places permanently swampy, grow many peculiar plants, confined to this environment and some of them now far removed from the general range of their kind. The plants forming these colonies bear every evidence of being relics of a former wider distribution—stragglers left behind in retreat, which have managed to survive in these more favorable areas, beyond which they are unable to extend. Here, as erosion encroaches upon their strongholds, these are gradually becoming more circumscribed, and some of the species inhabiting them perhaps face ultimate extinction, a process and fate that is now being accelerated by the clearing away of the forest from part of the uplands, although this is of little agricultural value. The flora of the lowlands and that of the hills are very different; the majority of the peculiar plants of the latter are found only on the sandy and loamy soils that come to the surface where the later deposits have been removed. *Quercus arkansana* is practically restricted to these strips, although a few specimens have managed to establish themselves on the gravelly tops of some of the narrow ridges. As *Quercus marilandica* is found sparingly on the gravelly uplands the two sometimes

come in contact along this border line, although the former is not found on the sandy soil where *Q. arkansana* is abundant, nor the latter on the more sterile uplands. *Quercus nigra* belongs strictly to the lowlands flora and is not found with *Q. arkansana* nor in its environment.

The fine loamy sand (the Nackitoch sand of the U. S. soil survey map) upon which *Q. arkansana* grows here is not entirely lacking in lime, as is indicated by the presence of such more or less lime-loving plants as *Quercus Muhlenbergii*, *Ulmus fulva*, *Rhamnus caroliniana*, *Bumelia lanuginosa* and several species of *Crataegus* of the Molles group. Samples of this soil tested by Dr. E. T. Wherry, of the Bureau of Soils U. S. Dept. of Agriculture, were pronounced by him to be "minimacid" or almost neutral. The calcium element is, of course, derived from the marly fossiliferous layers. This soil is not extensively exposed but outcrops at intermediate levels between the lowlands and the top of the plateau, and in the ravines and along the courses of small streams traversing the latter. The limits of the plants peculiar to this zone are therefore defined by the comparatively sterile clays and gravels above and by the black stiff soils of the river floodplains below. It should be remarked that within these restricted sandy areas *Quercus arkansana* is nearly always present and is often very abundant; indeed in some places it is not only the commonest Oak, but actually constitutes a large part of the forest growth. I have seen and examined hundreds of specimens in such places and they could doubtless be counted by thousands. I am not aware of any hybrid that has succeeded in establishing itself in such numbers, or of becoming dominant over areas from which both parent species are excluded.

If instead of a hybrid we are, in the case of *Quercus arkansana*, here dealing with a relic colony of a species nearing extinction and limited by peculiar ecological conditions, we might reasonably expect to find similar relics elsewhere, where these conditions are approximated within its probable former range.

In traveling by automobile from Hot Springs to Texarkana, a few months ago, we passed towards evening through an eroded area bordering a small stream in the western part of Clark County, Arkansas. The general aspect of the region and its flora bore a striking resemblance to certain localities in the Hempstead County hills; my attention was first attracted here by the occurrence in ravines of a large fossil oyster (*Exogyra ponderosa*) and other fossils found at McNab. The lateness of the hour and an approaching thunder storm prevented an exploration of the locality, but a little farther down along a small sandy stream I had the satisfaction of finding a few small specimens of *Quercus arkansana*. A few days later on the same trip we passed near the locality in Alabama where Dr. Mohr, and later Dr. Harper, collected the Oak which I believe to be identical with the Arkansas species. Unfortunately I did not realize until too late that we were so near the habitat of this interesting tree, and I did not have the good luck to see it there. While the regions are so widely sepa-

rated and in some respects quite dissimilar they both lie on the border of the coastal plain, just below the piedmont, and there appear to be many points of similarity both in the topography and in the flora. In his note regarding the Alabama Oak, Harper says: "It grows mostly towards the edges of the Pocosin, but not in the sand-hills vegetation. It is one of the commonest species there."

It has been stated that *Quercus arkansana* is intermediate in characters between *Q. marilandica* and *Q. nigra*, but although there is a certain superficial resemblance in the foliage to some small-leaved forms of the former, it really has much less in common with that species than with the Water Oak. The short depressed acorns with very shallow cup, small buds, slender branchlets and its habit of growth all indicate a nearer relationship to the group to which *Quercus Phellos*, *Q. nigra* and *Q. obtusa* belong, and in the fruit and in texture and pubescence of the leaves there is some resemblance to *Q. imbricaria*. Harper compares the Alabama trees also to *Q. myrtifolia* and *Q. microcarya;* all of which suggests the apparent fact that it has no near counterpart amongst living American Oaks. In the original description Sargent compares it with *Q. marilandica*, but only to point out that it differs in almost all essential morphological characters from that species. In the Arkansas localities where it is so abundant I have had excellent opportunities for examining and comparing living specimens. There is a certain amount of variability in the habit and appearance of different individuals, in the character of the bark, the size of fruit, size and lobing of the leaves and amount of pubescence. However, these variations are not greater than are found in any other species with which I am acquainted, and not nearly so great as in most other Oaks. This, of course, should be expected, since the area is so limited and the ecological conditions under which the trees are growing are comparatively uniform. I think it no exaggeration to say that there is no species of American Oak that is more true to type or more easily recognizable in the field. Assuming that *Quercus arkansana* is a valid species, in the generally accepted sense of that term, the possibility must also be considered that it may hybridize with other species of black and red Oaks with which it comes in contact. These, in the order of frequency in which they occur, are *Quercus rubra*, *Q. Shumardii*, *Q. Phellos* and along the margins of its range *Q. velutina* and *Q. marilandica*. On a narrow gravelly ridge near Yellow Creek I found one tree which, from the character of the foliage and rough bark, I suspected of being a hybrid between *Q. arkansana* and *Q. marilandica*. As there has been no fruit on the trees there for the past two years, owing to late frosts, I have not yet been able to confirm this definitely.

Since the discovery of *Quercus arkansana* several attempts have been made at the Arnold Arboretum to propagate it from seeds and to get it into cultivation. At present there is a specimen growing in the Oak group, raised from seed collected by Professor Sargent in 1909. This is now a

thrifty plant more than eight feet in height, and in foliage and other characters it is quite typical and identical with the species as it grows in Arkansas. Another planting was made from seeds collected by myself in 1922 and some of these were transplanted to another part of the Arboretum, but apparently the plants have not survived. Before they were taken from the nursery rows I examined them carefully. There were, perhaps fifty or sixty plants, with from four to ten leaves at that time, every one of which was true to type and without the slightest indication of segregation of forms or of reversion. At the present time there are about 15 plants growing in the nursery, raised from seeds collected in 1923, which are now six to ten inches in height. All of these are remarkably uniform and true to the parent type. Seedlings of *Quercus marilandica*, planted about the same time, are growing just opposite in the next row. The *Q. arkansana* seedlings compared with these are distinguished by their more slender stems, the yellowish instead of bronze or reddish tinge of the older leaves, and the thinner texture, more slender petioles and more obtuse lobes of the latter.

During the past few years I have paid especial attention to hybrid Oaks in the field and have found, and collected from, more than one hundred trees representing supposed crosses between many different species. A number of these have been grown from seeds at the Arnold Arboretum and others have been propagated from grafts. In the case of the former, while unfortunately we have not been able to grow them in the quantity desirable for experimental purposes, segregation of forms and reversion to parent types, as is to be expected under the Mendelian laws, are nearly always noticeable; in the case of *Quercus arkansana*, as stated above, nothing of the sort has ever developed. In most of the hybrid Oaks with which I am acquainted there is a certain instability of type and polymorphism in foliage and other parts, not only between different individuals but also on different branches of the same plant, and a lack of uniformity and symmetry in the individual leaves, which easily betrays them. This is not found in the Oak we are considering, beyond the slight variations common to nearly all recognized species.

The extremely limited and widely interrupted range of *Quercus arkansana*, so far as at present known, and a misunderstanding as to its local abundance both at the Alabama and Arkansas stations, is probably largely responsible for perpetuating Dr. Mohr's first surmise as to its hybrid origin. However, similar if not always such extreme cases are not unknown amongst American woody plants. Such examples as *Quercus georgiana*, *Leitneria floridana*, *Cotinus americanus*, *Alnus maritima*, and *Andrachne phyllanthoides* come to mind. A score of other examples might be mentioned of trees and shrubs of the Southern Appalachian region, of which isolated colonies now exist in widely separated intervals through the mountainous parts of southern Arkansas and eastern Oklahoma; and if herbaceous species were taken into consideration more

striking examples could be cited and the list extended indefinitely. Most of these belong to well recognized species, the validity of which no one has yet ventured to question or to segregate on purely geographical grounds. It is precisely such cases as these referred to here that have the greatest value and significance in throwing light upon certain problems of distribution of species in our existing forest floras and of their former fluctuations; and it is partly because of my interest in these cases that I am not willing to have the testimony of so important a witness as *Quercus arkansana* impeached or to see the bar sinister placed upon its escutcheon, since none of the facts seem to warrant such action.

In this connection there may be mentioned another Oak which was found by Mr. W. W. Ashe in Okaloosa County, Florida, and described by him under the name of *Quercus caput-rivuli*, but which he has more recently referred as a variety to *Q. arkansana;* this I have not referred to for the reason that I am not yet satisfied, after an examination of co-type specimens, that it can safely be identified with the Arkansas Oak. However, without wishing to essay the hazardous role of prophet, I will venture to suggest that it is not improbable, as botanical exploration continues, that other isolated stations may yet be found for *Quercus arkansana;* and investigators of Quaternary deposits containing Oak remains should be on the lookout for it; for from all the evidence I am of the opinion that we are here dealing neither with a hybrid nor a recently evolved form, but on the contrary with an ancient species, probably once widely distributed over the Coastal Plain and now nearing extinction.

RHODODENDRON CHRYSOCALYX LEV. & VANIOT

ERNEST H. WILSON.

Rhododendron chrysocalyx Léveillé & Vaniot apud Léveillé in Fedde Rep. Spec. Nov. II. 113 (1906).

A much-branched twiggy shrub, the branchlets tortuous, clothed with appressed flattened red-brown strigose hairs. Leaves persistent, chartaceous, dimorphic, narrow-lanceolate to oblanceolate, 1.5–4 cm. long, 0.5–1 cm. wide, acute or obtuse, mucronulate, base narrow cuneate, margin revolute, crenate-serrate, ciliate, upper surface shining dark green, reticulate, secondary veins impressed, lower surface pallid with primary and secondary veins elevated, both surfaces with few scattered appressed shining brown flattened strigose hairs most plentiful on costa; petiole flattened, 0.3–0.5 cm. long, densely clothed with appressed red-brown strigose hairs. Flowers terminal, fascicled, 10–12 or more; fascicles 2–3-flowered, subtended by several semipersistent concave dull brown ciliolate acute glabrescent bud-scales; pedicel erect, 1–1.5 cm. long, with calyx and ovary densely clothed with shining red-brown flattened strigose hairs; calyx annular, obscurely toothed, ciliate; corolla rotate-funnelform; tube

narrow-cylindric, 0.8–1 cm. long, 5-lobed, lobes spreading, spathulate, obtuse; stamens 5, long exserted, about twice the length of corolla, filaments slender, puberulous, anthers oblong, 2.5 mm. long; pistil over-topping stamens, ovary ovoid, densely strigose, style filiform, glabrous, stigma capitate. Fruit oblong-ovoid, 0.8–1 cm. long, densely clothed with pilose red-brown hairs passing to gray; seeds dark brown, minute, ovoid, wingless.

China: province of Kweichou, *J. Cavalerie*, April and June, 1904 (nos. 1796, 2059 in Herb. Edinburgh).

Among some Rhododendron material courteously loaned by the Royal Botanical Gardens, Edinburgh, are the type specimens of Léveillé & Vaniot's *R. chrysocalyx*. This species is not recorded in Wilson & Rehder's Monograph and since the original description is brief it has been thought worth while to give an account of it here. The species is very distinct and is characterized by the shining yellow to red-brown strigose hairs which clothe the shoots, petioles, pedicels and ovary, by its narrow lanceolate to oblanceolate crenate-serrate leaves polished dark green on the upper surface and pallid on the lower, by its long exserted stamens and style. The corolla would appear to be white or pale pink. It is most closely related to *R. Mariae* Hance which has the same kind of pubescence, a corolla of the same shape and similarly long exserted stamens and pistil, but the leaves of Hance's species are very different, being entire, more coriaceous and less lustrous, elliptic or elliptic-lanceolate to obovate, from 3 to 9 cm. long and from 1 to 3 cm. wide. This marked difference in foliage gives the plant a very different appearance. Both belong to the section *Tsutsutsi* G. Don.

The two type specimens bear the name "*R. Mariesii*" in the handwriting of the late Professor I. B. Balfour and are said to have been determined as such by E. H. Wilson. When on a visit to Edinburgh in the summer of 1920 I was shown these specimens among many others and apparently got the names confused. *R. chrysocalyx* Lév. & Vaniot does not even belong to the same section as *R. Mariesii* Hemsl. & Wils.

NEW SPECIES, VARIETIES AND COMBINATIONS FROM THE HERBARIUM AND THE COLLECTIONS OF THE ARNOLD ARBORETUM[1]

Alfred Rehder.

× **Taxus Hunnewelliana** (*T. canadensis* × *cuspidata*), hybr. nov.

Intermediate between the parents: from *T. canadensis* Marsh. it differs in its more vigorous and upright habit, the stouter branchlets with the leaf-bases more swollen and usually more or less brownish the second year, even on weaker branchlets, and darker brown on stouter branchlets,

[1] Continued from vol. V. 242.

in the lower scales of the winter-buds being broader and stouter, not ovate-lanceolate or even lanceolate and acuminate as in *T. canadensis*, in the stouter and thicker, broader and longer leaves, up to 2.5 or even 3 cm. long and usually 2 mm. broad, with the green margin on the underside much narrower than the stomatic band, in *T. canadensis* only slightly narrower than the stomatic band, and in the more swollen and prominent leaf-base; the leaves spreading more or less upward and forming a more or less well defined V-shaped depression on the upper side of the branchlets.

From *T. cuspidata* Sieb. & Zucc. it differs in its slenderer branchlets scarcely lustrous and green or greenish during the first winter, in the narrower scales of the winter-buds, in *T. cuspidata* generally ovate and the lower ones triangular-ovate, in the slenderer and thinner leaves, scarcely exceeding 2 mm. in width, with the green margin of the under side broader, in *T. cuspidata* only about half as broad as the stomatic band; the leaves being usually more or less directed forward not spreading at nearly right angles, and forming a less clearly defined V-shaped depression above.

Plants and specimens examined: plants growing in the Arboretum under no. 17642 (specimens: December 23, 1924 [type]) and under no. 10760 (specimens: September 16, and December 21, 1923).

This interesting addition to the Yews hardy in the climate of Massachusetts, was raised on the Hunnewell estate at Wellesley, Massachusetts, by Mr. T. D. Hatfield a number of years ago. The plants are intermediate between the parents not only in the characters given above, but also in the color of the foliage and in general appearance, though they are yet too young to allow an opinion regarding the habit they will finally assume.

Juniperus chinensis L. var. **japonica** Lav. f. **alba,** comb. nov.

Juniperus japonica argentea-variegata Smith, Pl. Fir-tribe, 19 (? 1872–5), not *J. chinensis argenteo-variegata* Beissner.

Juniperus japonica alba Standish apud Gordon, Pinet. ed. 2, 161 (1875).

Juniperus chinensis procumbens albo-variegata Beissner, Handb. Nadelholzk. 121 (1891).

Juniperus chinensis var. *decumbens albo-variegata* Hornibrook, Dwarf Conif. 66 (1923).

A dwarf shrub with spreading or procumbent branches variegated with white.

Juniperus horizontalis f. **glomerata,** forma nova.

A typo recedit ramulis valde abbreviatis congestis glomeratis foliis omnibus oppositis squamiformibus densissime imbricatis ovatis 1.5–2 mm. longis acuminulatis.

Specimens and plants growing in the Arnold Arboretum examined: collected on the coast of Maine by H. L. T. Wolcott in 1897 (no. 14860; specimens: December 8, 1924, type); and collected near Rockingham Junction, Maine, by G. P. Douglas in 1911 (no. 14862; specimens: December 8, 1924).

This Juniper is a very distinct form which apparently belongs to *J.*

horizontalis Moench, though in habit it looks quite different; instead of sending out long trailing shoots, it develops on rather short and often twisted prostrate stems dense masses of crowded very short branchlets forming irregularly subglobose clusters flattened at the apex and not more than 15 cm. tall. The leaves are all scale-like, minute and closely imbricated, bright green except near the end of the branchlets where they assume in autumn the purple-violet color peculiar to *J. horizontalis*. Occasionally, but very rarely, elongated shoots appear which cannot be distinguished from typical *J. horizontalis* and thus indicate the origin of this form.

Juniperus horizontalis f. **alpina**, comb. nov.

Juniperus Sabina [var.] 5. *alpina* Loudon, Arb. Brit. IV. 2499, fig. 2362 (1838).
Juniperus alpina Loddiges Cat. (1836), as synon., ex Loudon, l.c.

A typo recedit ramis ascendentibus vel erecto-patentibus nec prostratis, ramulis suberectis, caulibus initio suberectis et ad 75 cm. altis, demum prostratis apice ascendentibus, ramos suberectos emittentibus, foliis fere omnibus acicularibus oppositis, in axibus primariis robustioribus tantum ternatis, erecto-patentibus lanceolatis vel lineari-lanceolatis 2–5 mm. longis.

Specimens and plants examined: plants growing in the Arnold Arboretum under no. 8028 (specimens: October 27, 1924).

This form differs considerably from the type in its upright or ascending habit and in its juvenile acicular foliage. Young plants have upright or nearly upright stems with upright or ascending branches forming little columns which finally bend over and become prostrate, but are always ascending at the apex and develop branches which also are upright or ascending. In one of the parks at Rochester there are plants more than 20 years old which, as Mr. R. E. Horsey of the Rochester Park Department informs me, have trailing stems over 6 feet in length and upright branches from 20 to 24 inches or occasionally to 30 inches in height. The plants are not known to have produced fruit. I can not refer this form to any other species than to *J. horizontalis*. The final habit of the plant is similar to that of *J. Sabina* L., but the acicular leaves are only slightly spreading or even loosely appressed, spreading at an angle of less than 45 degrees and are more abruptly and less sharply pointed, while the juvenile leaves of *J. Sabina* and also of *J. virginiana* are more gradually narrowed, stiffer and more pungent and spread at an angle of 45 degrees or more; also the green midrib on the upper surface of the leaves is more pronounced in *J. Sabina* than it is in this form and in typical *J. horizontalis*. Furthermore the absence of the strong odor which the crushed branchlets of *J. Sabina* exhale and the pale bluish violet bloom the plant assumes in autumn would indicate that it belongs to *J. horizontalis* rather than to *J. Sabina*, though the original name suggests a plant introduced from the European Alps. The description of Loudon, however, as far as it goes, and the figure of a branchlet agree well with our plant, which came originally from Ellwanger and Barry's Nursery under Loudon's name.

Juniperus horizontalis f. plumosa, comb. nov.

Juniperus communis depressa plumosa Andorra Nurseries, Price-list, Spring, 1919, p. 8; Autumn, 1919, p. 11 (1919), name.

A typo recedit habitu depresso ramis ascendenti-patentibus vel fere horizontaliter patentibus nec prostratis, foliis omnibus vel fere omnibus acicularibus oppositis vel tantum in ramis primariis robustioribus ternatis patenti-erectis vel leviter subaccumbentibus 2–6 mm. longis, per autumnum et hiemen colore violaceo suffusis.

Specimens and plants examined: plants growing in the Arnold Arboretum received from the Andorra Nurseries near Philadelphia, Penna., in 1922 (no. 11138; specimens: October 27, 1924); from Cornell University in 1922 (no. 13357; specimens: October 27, 1924) and from Jeffrey's Nursery, Long Island in 1921 (no. 11348; specimens: October 27, 1924).

This form resembles in its foliage the preceding form though the leaves are perhaps slightly longer and less spreading and assume a more conspicuous violet color in autumn, but it differs in its low depressed habit with ascending-spreading or nearly horizontally spreading branches shorter and more loosely branched than in the type, forming a depressed bush with flattened top about 40–50 cm. tall and more in diameter. It is apparently a form of *J. horizontalis* and differs in its leaves from forms of *J. Sabina* and *J. virginiana* in the same characters as pointed out under the preceding form. The plant from Jeffrey's Nursery shows a tendency to become prostrate and in this respect approaches the type.

Abies alba Mill. **f. compacta,** comb. nov.

Picea pectinata compacta Parsons, Cat. 65 (1899).

Abies pectinata compacta Beissner in Mitt. Deutsch. Dendr. Ges. VIII. 108 (1899).—Hornibrook, Dwarf Conif. 23 (1923).

This form originated in the nursery of S. B. Parsons & Son, Flushing, New York, sometime before 1899. There is a large healthy specimen of this form on the Hall estate near Warren, Rhode Island, about 8 feet tall and 12 feet through. The form makes a dense roundish bush with ascending branches and crowded short branchlets; the leaves are very lustrous and about 1.5 cm. long.

Cedrus libanotica Link **f. glauca,** comb. nov.

Cedrus Libani 2. *foliis argenteis* Loudon, Arb. Brit. IV. 2402 (1838).

Pinus Cedrus 1. *foliis argenteis* (Loud.) Antoine, Conif. 57 (1840).

Cedrus Libani glauca Knight & Perry, Syn. Conif. 42 (1850), name only.—Carrière, Traité Conif. 284 (1855).

Abies Cedrus (B) *argentea* Lindley & Gordon in Jour. Hort. Soc. Lond. v. 214 (1850), name only.

Cedrus Libani argentea Loudon apud Gordon, Pinet. 44 (1858).

Pinus Cedrus β. *glauca* Parlatore in De Candolle, Prodr. XVI. pt. II. 408 (1868).

Cedrus Cedrus f. *glauca* Voss, Vilmorin Blumengärt. ed. 3, I. 1231 (1896).

This form differs from the type in the glaucous or bluish white color of its leaves.

Cedrus libanotica f. nana, comb. nov.

Cedrus Libani 3. *nana* Loudon, Arb. Brit. IV. 2403 (1838).—Carrière, Traité Conif. 284 (1855); ed. 2, 371 (1867).—Beissner, Handb. Nadelholzk. 301 (1891).—Hornibrook, Dwarf Conif. 25 (1923).

Pinus Cedrus 2. *nana* (Loud.) Antoine, Conif. 57 (1840).

This is a dwarf rather compact form, usually forming a round bush. According to Carrière (l. c. ed. 2) the form cultivated as "Comte de Dijon" belongs here.

Cedrus libanotica f. pendula, comb. nov.

Cedrus Libani pendula Knight & Perry, Syn. Conif. 42 (1850), name only.—Carrière, Traité Conif. 284 (1855).—Beissner, Handb. Nadelholzk. 301 (1891).

This form differs from the type in its pendulous branches and branchlets.

It seems strange that Link's name *C. libanotica*, which is the oldest binomial under Cedrus for the Lebanon Cedar, should have been overlooked or passed over until very recently, but probably the fact that Link himself in his later publications abandoned this name in favor of *C. Libani* and did not even cite it as a synonym and that it is not cited in Index Kewensis accounts at least partly for this fact. To make it clear that according to the International Rules *C. libanotica* is the correct name for this species, a complete enumeration of the synonyms known to me may follow here:

Cedrus libanotica Link, Handb. II. 480 (1831).—Ascherson & Graebner Syn. Mitteleur. Fl. ed. 2, I. 316 (1913), as synon. of *C. Cedrus*.—Hayek, Prodr. Fl. Pen. Balcan. (in Fedde Rep. Spec. Nov. Beih. XXX) 41 (1924).

Pinus Cedrus Linnaeus, Spec. 1001 (1753).

Larix Cedrus Miller, Gard. Dict. ed. 8, no. 3 (1768).

Pinus effusa Salisbury, Prodr. 399 (1796).

Abies Cedrus Poiret, Dict. VI. 510 (1804).

Larix patula Salisbury in Trans. Linn. Soc. VIII. 314 (1807).

Cedrus Libani [Barrelier, Pl. Icon. 499 (1714)].—Lawson Agric. Man. 379 (1836).—Loudon, Arb. Brit. IV. 2402 (1838).

Cedrus patula K. Koch, Dendr. II. 268 (1873).

Cedrus Cedrus Huth in Helios, XI. 133 (1893).

Cedrus effusa Voss in Mitt. Deutsch. Dendr. Ges. XVI. 92 (1907).

Pinus Cedrus var. *effusa* Voss in Putlitz & Meyer, Landlex. IV. 768 (1913).

Cedrus libanotica subsp. *C. Libani* Holmboe in Bergens Mus. Skrift. n. ser. I. no. 2, 30 (Stud. Veg. Cyprus) (1914).

The combination *C. libani* cannot be credited to Barrelier, as this is a prelinnean author, neither can the combinations proposed by K. Koch and Voss be accepted since they are based on non-valid names.

Salix Matsudana f. umbraculifera, forma nov.

Salix spec. F. N. Meyer in U. S. Dept. Agric. Bur. Pl. Indust. Bull. CVI. (Invent. Seeds Pl. Imp. no. XII) 51, no. 1737 (1907).

Salix spec. Anon. in U. S. Dept. Agric. Bur. Pl. Indust. Bull. For. Pl. Introd. LXXX. 602, fig. (1912).

Salix ? Matsudana f. "Saule Man-tou-liu" Hers in Bull. Dendr. France, 1923, p. 153, t. 15.

A typo recedit habitu humiliore et densiore coma subglobosa vel semiglobosa.

This remarkable Willow forms a dense head subglobose in young trees, semiglobose and broader than high in older trees, and looks as if it had been pruned, as the twigs at the end of the more or less upright branches are of nearly the same length and no leading shoots are produced. This Willow is much planted in the neighborhood of Peking and is called by the Chinese "man-t'ow-liu" (bread willow) in reference to its shape which in older trees resembles a round loaf of bread. It was introduced by F. N. Meyer to America in 1906; plants at Chico, California, have grown rapidly, attaining in 6 years 20 feet in height and 30 feet in spread and have retained their peculiar habit as the photograph reproduced in the Bulletin of foreign plant introductions cited above shows. The only figure showing the habit of typical S. Matsudana known to me is one published by Hers (in Bull. Soc. Dendr. France, 1923, t. 14).

Salix Matsudana f. **tortuosa** Vilmorin in Jour. Soc. Nat. Hort. France, ser. 4, XXV. 350 (1924), as var., name only.

Salix Matsudana var. "lung chao liu" Hers in Bull. Soc. Dendr. France, 1923, p. 153.

A typo recedit ramis ramulisque tortuosis.

This peculiar form with tortuous and twisted branches is cultivated by the Chinese under the name "lung chao liu" (dragon's claw willow). According to Hers it is short-lived, because susceptible to attacks by insects which find shelter between the twisted branches. Apparently now in cultivation in Vilmorin's Nursery at Verrières near Paris.

Salix repens var. **nitida** Wenderoth, Fl. Hass. 345 (1846).—Toepffer in Ber. Bayer, Bot. Ges. XV. 148 (1915), as forma.

Salix arenaria Linnaeus, Spec. 1019 (1753), in part.
Salix lanata Roth, Enum. Fl. Germ. I. 418 (1788), not Linnaeus.
Salix argentea Smith, Fl. Brit. III. 1059 (1804).
Salix depressa C. *nitida* Seringe, Essai Saul. Suisse, 10 (1815).
Salix repens δ *argentea* Wimmer & Grabowski, Fl. Siles. II. 380 (1829).
Salix repens γ *sericea* Gaudin, Fl. Helv. VI. 234 (1830).
Salix fusca γ *arenaria* Wahlenberg, Fl. Suec. II. 671 (1833).
Salix fusca b. *argentea* G. F. W. Meyer, Chlor. Hannov. 446 (1836).
Salix repens γ *latifolia* Döll, Rhein. Fl. II. 502 (1843).
Salix repens [subsp.] *S. arenaria* Andersson in Svensk. Vetensk. Akad. Handb. VI. 115 (Monog. Salic.) (1867).
Salix repens [f.] *arenaria* Andersson in Blytt, Norges Fl. II. 434 (1874).
Salix californica Hort. ex Dippel, Handb. Laubholzk. II. 263 (1892), as synon.
Salix grisea Hort. ex Dippel, l. c. (1892), as synon.
Salix grisea pendula Hort. ex Dippel, l. c. (1892), as synon.
Salix repens C. *lanata* Camus, Classif. Saul. Eur. I. 168 (1904).
Salix repens subsp. *S. argentea* Camus, l. c. t. 15 (1904).
Salix repens subsp. *dunensis* Rouy, Fl. France, XII. 209 (1910).

As Wenderoth's name, applying apparently to the same form as Seringe's *S. depressa nitida* which I take to be the oldest varietal name of that variety or group of forms called by many authors *S. repens* var. *arenaria*, has been overlooked or passed over by most authors, I have given an enumeration of the synonyms of this variety. Toepffer in his Salices Bavariae,

p. 148 (in Ber. Bayer Bot. Ges. xv. [1915]) refers Wenderoth's variety as a form to typical *S. repens* and considers it distinct from var. *arenaria*, but von Seemen (in Ascherson & Graebner, Syn. Mitteleur. Fl. iv. 126 [1909]) unites both under var. *arenaria* and I see no perceptible difference between Seringe's type (Saules de la Suisse, no. 62) which I have before me and specimens referred by Toepffer to var. *arenaria* or var. *argentea*.

Quercus Stewardii, spec. nov.

Frutex 3-metralis ramulis glabris annotinis fusco-purpureis lenticellatis. Folia decidua, brevissime petiolata et in apice ramulorum congesta, lyrato-obovata, 7–11 cm. longa et 4.5–7 cm. lata, utrinque lobis brevibus obtusis 10–14 et tot venis 4–6 mm. distantibus, supra laete viridia et glabra, subtus glaucescentia, secus costam basin versus et ad basin venarum inferiorum tomento floccoso detersili instructa; petioli 2–4 mm. longi. Fructus in apice ramulorum circiter 6–7 congesti subsessiles, cupula hemisphaerica circiter 1 cm. alta et intus 1.5 cm. lata, bracteis tenuibus pallide brunneis extus tenuiter villosis, inferioribus brevioribus exceptis linearilanceolatis vel linearibus ad 8 mm. longis basi leviter appressis supra recurvis scariosis, glande (nondum perfecte matura) subglobosa circiter 12 mm. diam., apice depresso et manifeste umbilicata.

China. Anwhei: Wang shan, in forest at summit, alt. 2000 m., *A. N. Steward*, no. 1317, August, 1924 (Herb. Univ. Nanking, no. 7182; type).

This new species seems most nearly related to *Q. obovata* Bunge which it resembles in the character of its cupula but the scales are much shorter than in that species, and the branchlets and the much smaller leaves are glabrous except a slight floccose tomentum along the midrib on the under side of the leaves. The leaves are similar to those of *Q. mongolica* Fisch. and particularly of its variety *grosseserrata* Rehd. & Wils., but they are distinctly lyrate in outline, the lobes are obtuse, not acutish and the veins are closer together, while the fruits are entirely different. Though this new species is in some respects intermediate between *Q. obovata* and *Q. mongolica*, it is quite different in leaf and fruit from *Q. McCormickii* Carruthers which is considered a hybrid between these two species.

Ulmus hollandica var. **Dauvessei**, comb. nov.

Ulmus montana var. *Dauvessei* Nicholson, Kew Handlist Arb. ii. 139 (1896), name only.

Ulmus campestris var. *Dauvessei* Hort. ex Nicholson, l. c.

Ulmus Dauvessei Henry in Elwes & Henry, Trees Gr. Brit. Irel. vii. 1874 (1913).

This Elm belongs apparently to one of the numerous hybrids of *Ulmus glabra* Huds. with *U. foliacea* Gilib. and perhaps *U. procera* Salisb. which may be classed under the name *U. hollandica* Mill. It resembles *U. glabra* in the pubescence of its branchlets and leaves, but the latter are smaller and comparatively broader and of thinner texture and the petioles are up to 6 mm. long; it is of broad-pyramidal habit with ascending branches.

The origin of this tree is unknown to me and I have found no further citations in horticultural literature than those quoted above. According to Henry the tree in Kew, of which there are specimens in this herbarium collected in 1880 by Nicholson and in 1912 by Henry, was received from Lee in 1879.

Ribes sativum f. **variegatum**, comb. nov.

Ribes vulgare f. *variegatum* (Weston) Rehder in Jour. Arnold Arb. I. 254 (1920) where synonyms and references are given.

As the name *Ribes vulgare* Lam. used by Janczewski for the species to which most of our cultivated Currants belong is really only a synonym of *R. rubrum* L., the name *R. sativum* Syme has to take the place of the name *R. vulgare* Lam. The variety of *Ribes rubrum* with striped berries named by Berlandier *R. rubrum β variegatum* must not be confused with *R. rubrum variegatum* West. and will have to be called R. **sativum** f. **striatum**, comb. nov. (*R. vulgare* f. *striatum* (Kuntze) Rehder in Jour. Arnold Arb. I. 255 [1920]), where synonyms and references are given).

Hamamelis japonica var. **flavo-purpurascens**, comb. n.

Hamamelis incarnata Makino in Tokyo Bot. Mag. XXVII. 71 (1913).
Hamamelis obtusata (Matsum.) Makino, l. c. 150.
Hamamelis japonica var. *obtusata* Matsumura ex Makino, l. c., as synon.
Hamamelis obtusata f. *flavo-purpurascens* Makino in Jour. Jap. Bot. I. 8 (1916).

JAPAN.

This Japanese Witch Hazel seems to differ from *H. japonica* only in the color of the petals which are more or less purplish or suffused with purple and purple-veined chiefly toward the base. I do not think that the two color forms distinguished by Makino can be clearly separated; he describes the type as having flesh-colored petals deeper flesh-colored toward the base and 2–2½ mm. wide, and the petals of his f. *flavo-purpurascens* as "1⅔ mm. wide in the middle, yellow but purpurascent and deeper colored veined toward the lower portion gradually." Judging from the plant growing in this Arboretum and introduced by Mr. Wilson in 1919 from Japan the color may vary in different years, for flowers collected in 1920 have the petals suffused with purplish their whole length while those collected in 1923 are almost clear yellow in their upper part. Similar color-variations occur in the American *H. vernalis* Sarg. and in *H. virginiana* of which I described a form with purplish petals as f. *rubescens* in this Journal (III. 210) two years ago. The leaves are not different from those of *H. japonica*, those of our plant are mostly pointed at the apex, not obtuse to subemarginate as described by Makino, and perhaps slightly more pubescent than typical *H. japonica* usually is.

(*To be continued.*)

AMERICAN TREES AND SHRUBS IN THE PARK OF HATARMAJOR, RUMANIA.[1]

The park of Határmajor is situated southeast of Temesvar in the plain of the so-called Banat and northwest of the mountains of Karanseles in that part of Hungary which, owing to the peace treaty of Trianon, has been ceded to Rumania. The park is part of the estate belonging to Count Louis Ambrózy, now Hungarian Envoy extraordinary and Minister plenipotentiary in Vienna, Austria, who was from 1907 to 1910 a member of the Austro-Hungarian Embassy in Washington, and being an ardent plant lover, paid, during that time, frequent visits to the Arnold Arboretum. These visits awakened his interest in American trees and shrubs and inspired him to try the acclimatization of these plants in his native country. In this undertaking, he received the vigorous support of Professor Sargent, and seeds secured through the Arnold Arboretum were sent to his estate in Hungary and there successfully raised. After his return to Hungary, Count Ambrózy started to lay out with the help of a prominent landscape architect an extensive park surrounding his castle at Határmajor. Of this park a section was devoted exclusively to American trees and shrubs. He also made, outside the park, plantations on a large scale of economically important American trees such as Hickories, Black Walnut, Elms, Canadian Poplar and Red Cedar, which all are now in a flourishing condition and promise valuable returns. One of the most interesting is the plantation of Hickories consisting of six species in thousands of trees planted in close stands. They were planted in 1909 and have grown rapidly; they probably form now the finest plantation outside of America of Hickories, which always have remained rare trees in European gardens and parks.

The climate of Határmajor seems to be congenial to American plants as the profuse flowering of Chionanthus and *Cercis canadensis* shows, the latter even tends to become naturalized for seedlings are springing up under the old trees. *Castanea dentata* and *C. pumila* are both producing fruit and the former apparently could be grown more successfully there than in its native country, where it is now decimated by the chestnut-blight. A grove of *Taxodium distichum*, though planted on rather dry soil, is doing well. The winter in southern Hungary seems to be rather mild and probably more like that of the middle Atlantic States, if we may judge by the fact that *Jasminum nudiflorum*, planted on the walls of the castle, begins to bloom in January, and that evergreen shrubs like *Prunus Laurocerasus* and *P. lusitanica* and *Pyracantha coccinea* flourish.

To show how well the American ligneous flora is represented at Határmajor, a list of the species growing there may be given here.

Abies lasiocarpa var. arizonica Lemm.
Acer rubrum L.
acer saccharinum L. (*A. dasycarpum* Ehrh.)
" saccharum Marsh.

[1]Extracted from a German translation of a Hungarian manuscript by Dr. Gustav Moesz.

Aristolochia durior Hill (*A. macrophylla* Lam.)
Aesculus octandra Marsh.
" Pavia L.
Baccharis halimifolia L.
Benzoin aestivale Nees.
Betula papyrifera Marsh.
Campsis radicans Seem. (*Tecoma radicans* Juss.)
Carya alba K. Koch. (*C. tomentosa* Nutt.)
" cordiformis K. Koch. (*C. amara* Nutt.)
" glabra Sweet, (*C. porcina* Nutt.)
" laciniosa Loud. (*C. sulcata* Nutt.)
" ovata K. Koch. (*C. alba* Nutt.)
" pecan Engl. & Graebn. (*C. olivaeformis* Nutt.)
Castanea dentata Borkh.
" pumila Mill.
Catalpa bignonioides Wall.
" speciosa Ward.
Celtis occidentalis L.
Cercis canadensis L.
Chamaecyparis Lawsoniana Parl.
Chionanthus virginica L.
Clematis virginiana L.
Clethra alnifolia L.
Comptonia asplenifolia Ait.
Cornus florida L.
" racemosa Lam. (*C. candidissima* Marsh.)
" stolonifera Michx.
Crataegus coccinea L.
" crus-galli L.
" phaenopyrum Med. (*C. cordata* Ait.)
Diospyros virginiana L.
Fraxinus americana L.
" pennsylvanica Marsh.
Gymnocladus dioeca K. Koch.
Halesia carolina L.
Hamamelis virginiana L.
Juniperus virginiana L.
Liquidambar styraciflua L.
Liriodendron Tulipifera L.
Lonicera sempervirens L.
Maclura pomifera Schneid.
Magnolia acuminata L.
" tripetala L.
Myrica carolinensis Mill.
Nyssa sylvatica Marsh.
Osmaronia cerasiformis Greene.
Ostrya virginica Willd.
Parthenocissus quinquefolia Planch.
Picea pungens Engelm.
" sitchensis Carr.
Pinus Banksiana Lamb.
" Jeffreyi Balf.
" ponderosa Laws.
" resinosa Ait.
" rigida Mill.
" strobus L.
" taeda L.
Populus balsamifera L. (*P. deltoidea* Marsh., *P. canadensis* Mich. f., not Moench).
Pseudotsuga taxifolia Brit. (*P. Douglasii Carr.*)
" " var. caesia Aschers. & Graeb.
Quercus alba L.
" bicolor Willd. (*Q. platanoides* Sudw.)
" borealis var. maxima Ashe (*Q. rubra* Auth., not L.)
" coccinea Muenchh.
" imbricaria Michx.
" macrocarpa Mich.
" prinus L.
" rubra L. (*Q. falcata* Michx.)
" stellata Wangh. (*Q. minor* Sarg.)
Rhus aromatica Ait.
" copallina L.
" typhina L.

Robinia luxurians Schneid. (*R. neo-mexicana* Auth., not Gray).
Rubus parviflorus Nutt.
Sambucus canadensis L.
Sassafras officinale Nees & Eberm.
Taxodium distichum Rich.
Thuja occidentalis L.
Thuja plicata Don (*T. gigantea* Nutt.)
Tilia americana L.
Tsuga canadensis Carr.
Viburnum Lentago L.
Zanthorhiza apiifolia L'Hérit.

Besides the plants enumerated above, many trees and shrubs of other parts of Europe and of Asia have found a home at Határmajor, which is not only a beautiful park, but of much greater value and wider interest as a successful experiment in the acclimatization of foreign plants to the climate of southeastern Europe. Unfortunately it will be manifestly impossible for Count Ambrózy to maintain the park as it was planned, since in 1922 the Rumanian government, after passing the Agrarian reform bill, expropriated Count Ambrózy and left him of an estate of approximately 3750 Hungarian catastral acres (5330 English acres) only about 137 Hungarian catastral acres, of which 56 belong to the park and yield therefore no return; it is apparent that the income from less than 100 Hungarian catastral acres (140 English acres) is entirely inadequate to keep up the park. The extensive plantations of valuable American trees, which would have yielded considerable income, have been taken over by the Rumanian government, and are now under the Forestry Service of that country. It certainly would be highly desirable to find ways and means to prevent Count Ambrózy's undertaking, considering its practical, scientific, and esthetic value, from going to ruin, and Count Ambrózy (address: Bankgasse 6, Vienna, Austria) would be glad to receive suggestions in this respect.

THE EXACT DATES OF PUBLICATION OF MIQUEL'S ANNALES MUSEI BOTANICI LUGDUNO-BATAVI AND PROLUSIO FLORAE JAPONICAE.

T. Nakai

Annales Musei botanici Lugduno-Batavi and Prolusio Florae Japonicae are the most important and best known of the different works published by Miquel. The dates, however, of the various parts of these two publications are not exactly known. In botanical works they are usually approximately cited as 1863–4, 1866–7, 1868–9. As a certain number of contemporaneous botanical publications exist which deal with the plants of eastern Asia, it is often necessary to know exactly which one has priority. I have questioned the Dutch botanists at Leyden in regard to these works without obtaining satisfactory information. I have been, however, fortunate enough to see in the library of the Botanic Garden at Edinburgh,

the cover pages of the Annales, and thus I was able to ascertain the exact dates of publication of this work.

Annales Musei Botanici Lugduno-Batavi was published in the years from 1863 to 1869. The work is in 4 volumes. Each volume contains 10 fascicles and each fascicle 8 signatures with 32 pages of text and one plate; the price of the fascicle was 3 francs. Day and month of the publication of the fascicles are not mentioned. The years of publication are as follows:

Vol. i.

Fasc. 1.	signatures	1–8, pp.	1–32, pl. 1.	
" 2.	"	9–16, "	33–64, " 2.	
" 3.	"	17–24, "	65–96, " 3.	1863.
" 4.	"	25–32, "	97–128, " 4.	
" 5.	"	33–40, "	129–160, " 5.	
" 6.	"	41–48, "	161–192, " 6.	
" 7.	"	49–56, "	193–224, " 7.	
" 8.	"	57–64, "	225–256, " 8.	
" 9.	"	65–72, "	257–288, " 9.	1864.
" 10.	"	73–80, "	289–318, " 10.	
		with "	321–331, of Index.	

Vol. ii.

Fasc. 1.	signatures	1–8, pp.	1–32, pl. 1.	
	containing the conclusion of the Index to Vol. i.			
" 2.	"	9–16, "	33–64, " 2.	
" 3.	"	17–24, "	65–96, " 3.	1865.
" 4.	"	25–32, "	97–128, " 4.	
" 5.	"	33–40, "	129–160, without pl.	
" 6.	"	41–48, "	161–192, pl. 5 & 6.	
" 7.	"	49–56, "	193–224, " 7.	
" 8.	"	57–64, "	225–256, " 8.	1866.
" 9.	"	65–72, "	257–288, " 9.	
" 10.	"	73–80, "	289–313, " 10.	

Vol. iii.

Fasc. 1.	signatures	1–8, pp.	1–32, pl. 1.	
" 2.	"	9–16, "	33–64, " 2.	
" 3.	"	17–24, "	65–96, " 3.	
" 4.	"	25–32, "	97–128, " 4.	
" 5.	"	33–40, "	129–160, " 5.	
" 6.	"	41–48, "	161–192, " 6.	1867.
" 7.	"	49–56, "	193–224, " 7.	
" 8.	"	57–64, "	225–256, " 8.	
" 9.	"	65–72, "	257–288, " 9.	
" 10.	"	73–80, "	289–315, " 10.	

Vol. iv.

Fasc. 1.	signatures	1–8, pp.	1–32, pl. 1.	
" 2.	"	9–16, "	33–64, " 2.	
" 3.	"	17–24, "	65–96, " 3.	1868.
" 4.	"	25–32, "	97–128, " 4.	
" 5.	"	33–40, "	129–160, " 5.	

and botanist, came to the Arboretum to discuss Chinese explorations and was enthusiastic about the exploration of the Richthofen and Amne Machin Ranges and willing to undertake it.

The Arboretum was fortunate in being able to make a satisfactory arrangement for this expedition in which the Harvard Museum of Comparative Zoology joined in the hope of obtaining additions from this unknown region for its ornithological collection.

Rock sailed from San Francisco on September 30th. He had intended to go first to Peking to discuss his plans with some of the Chinese officials and some of the Americans established there, but political conditions in the Chinese capital at this time caused him to give up this plan and he went by Shanghai and Hongkong to Haiphong in Tonkin where he arrived on the 5th of November. By rail he went to Yunnan-fu where he was able to gather the skilful collectors and cook who had already been with him in China and who accompanied him northward. From Yunnan-fu his long journey northward by mule commenced. Few men could have survived the dangers and hardships of this journey and retained their cheerfulness and hope of future success. The party was constantly attacked by brigands and with difficulty obtained military protection from the government. From Suifu in the Province of Szechuan, Rock wrote on January 27th,—

"After an exasperating trip through a country suffering from famine, we arrived hale and hearty in Suifu. In Chaotung I was delayed ten days by terrible snowstorms. It snowed for nine days and nights without interruption, and as the trail

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Agriculture to visit Burma, Assam and Siam in order to obtain knowledge and material of the Chaulmoogra Tree (*Taraktogenos Kurzii* King), the oil of which is reported a cure for leprosy. This duty finished, he devoted himself, under the auspices of the National Geographic Society of the United States, to exploring the natural history of the southern Chinese Province of Yunnan, returning from China to Washington in the spring or early summer of 1924.

Mr. Rock is the author, with Dr. L. Radlkofer of Munich, of "New and Noteworthy Hawaiian plants" published by the Board of Agriculture and Forestry, Territory of Hawaii, in 1911, "The Indigenous trees of the Hawaiian Islands," with 215 photo-engravings, published under patronage, in Honolulu in 1913, "Palmyra Island, with a description of its flora," with the cooperation of O. Beccari and others, being Bulletin No. 4, College of Hawaii Publications, 1916, "The Ornamental Trees of Hawaii," with 79 photo-engravings and 2 colored plates, published under patronage, Honolulu 1917, "A monographic study of the Hawaiian species of the Lobelioideae, family Campanulaceae," in the Memoirs of the Bernice Pauahi Bishop Museum, volume vii, No. 2, Honolulu 1919. Articles by Rock illustrated by his own photographs are entitled,—"Notes upon Hawaiian plants with descriptions of new species and varieties," with 5 plates, published in Honolulu 1911, "Descriptions of new species of Hawaiian plants," published in "The Hawaiian Peperomias" in 1913, "List of Hawaiian names of plants," published by the Board of Agriculture and Forestry, Honolulu 1913, "The Sandalwoods of Hawaii," published by the Board of Agriculture and Forestry, Honolulu 1916, "The Ohia lehua trees of Hawaii," published by the Board of Agriculture and Forestry, Honolulu 1917, "The Hawaiian genus Kokia, a relative of the cotton," published by the Board of Agriculture and Forestry, Honolulu 1919, "The Arborescent indigenous legumes of Hawaii," published by the Board of Agriculture and Forestry, Honolulu 1919, "The Leguminous plants of Hawaii," published by the Experiment Station, Honolulu 1920, "The Chaulmoogra tree [*Taraktogenos Kurzii*] and some related species," published by the U. S. Department of Agriculture, Washington 1922, four articles published in the "National Geographic Magazine" entitled,—"Hunting the Chaulmoogra tree," March 1922, "Banishing the devil of disease among the Nashi," November 1924, "The Land of the Yellow Lama," April 1925, and "Experiences of a lone geographer," September 1925; also "Field notes of the Rhododendrons collected in 1923–4," printed from manuscripts in the possession of the U. S. Department of Agriculture by Lionel de Rothschild. These publications can be seen in the library of the Arboretum.

Vol. iv. (*continued.*)

Fasc.	6.	signatures	41–48,	pp.	161–192,	pl.	6.	1869.
"	7.	"	49–56,	"	193–224,	"	7.	
"	8.	"	57–64,	"	225–256,	"	8.	
"	9.	"	65–72,	"	257–288,	"	9.	
"	10.	"	73–80	"	289–319,	"	10.	

Prolusio Florae Japonicae. Miquel's Prolusio florae japonicae published first in the Annales was also issued as a separate work which bears on its title-page the date 1866–1867. One part of the Prolusio was published together with Musci frondosi by C. M. Van der Sande Lacoste in the Annales toward the end of 1866; this part constitutes the end of the first half of the separate edition of the Prolusio. A special note at the foot of page 188 indicates the end of the first half which contains plate I. The second half was published in 1867; it begins with Ranunculaceae and contains plate II.

NOTES.

The Arnold Arboretum Expedition to North Central Asia.—In northern Kansu, the northwestern province of China, there is a high mountain region which appears on the map as the Richthofen Range and south of this in northern Tibet there is another region of high mountains (the Amne Machin Range). These two regions are botanically of special interest, for judging by their altitude and latitude the plants which clothe these mountain slopes should flourish in the northeastern United States and Canada, and in northern Europe and northern Japan. The interest in the botanical exploration of these regions is greatly increased by the fact that they are in the only part of the northern hemisphere which has not been more or less carefully worked over botanically, and that if there are anywhere new hardy trees they should be found in this part of central Asia. Much also might be learned here of the northern distribution of some of the important trees which grow farther south on the Chinese-Tibetan border.

During the summer of 1924, Mr. J. F. Rock,[1] the distinguished traveler

[1] Joseph F. Rock was born in Vienna, Austria, about forty-six years ago. As a boy he showed wonderful aptitude for acquiring languages by learning Chinese and Arabic, and early developed his love of travel by a journey with his father to Egypt. Nothing unfortunately is known at the Arboretum at this time of his experiences and studies until he reached the Hawaiian Islands, probably in 1907, and received the appointments of Professor of Botany and of Chinese in the College of Hawaii and Consulting Botanist to the Board of Commissioners of Agriculture and Forestry for the Territory of Hawaii. During his stay in Hawaii he devoted himself assiduously to the study of the Hawaiian flora, and during the years 1913–14 made a journey round the world for the purpose of studying Hawaiian specimens in American and European herbaria, remaining three months in the United States where he worked chiefly in the Gray Herbarium. His principal collection of dried Hawaiian plants is preserved in the herbarium of the College of Hawaii, but there is a large collection of duplicates in the Gray Herbarium and a very complete set of the indigenous woody Hawaiian plants in the herbarium of the Arboretum. He left Hawaii late in 1919 or early in 1920, and was in Washington in August of that year when he was employed by the Department of

is a horrible one as it is, descending through deep gorges and over mountain passes, it was impossible to go over it covered with several feet of snow, the mules could not negotiate it. There was nothing to do but to wait. We had no more experiences with brigands, thanks to the gods. At Laoyatan I discharged the mulemen and caravan as the road from here on is only possible for coolies and there are no horse inns provided. I was delayed three days in Laoyatan as it was difficult to get coolies; thirty-seven I had to employ. It was only four days from Chinese New Year and people are not willing to spend New Year's on the road."

On March 21st he wrote,—

"After an illness which kept me in the hospital at Chengtu for eight days (I contracted a severe attack of flu and bronchitis with a temperature of 104 Fahr.) I finally left Chengtu on March 16th. I was delayed mainly on account of the fighting and the unsettled condition of northern Szechuan."

Rock reached early in May, the Chinese town of Choni near the Tibetan frontier which will probably be his headquarters for the remainder of the year. Instead of the peaceful condition which he had expected in Kansu he found that serious trouble had broken out between the Chinese Mohammedans and the followers of the Living Buddha, and that under existing conditions it would be impossible to reach, as he expected, the Amne Machin Range by the way of Radja Gomba.

On June 24th he wrote,—

"I am leaving with my entourage for the Tebbu country once more crossing a mountain called Lissedzadza much higher than Mt. Koangkei. The former is east of Choni and some 16,000 feet in height. They all say there are immense forests, trees of enormous size, and the country is said to be wonderful. It is inhabited by a savage tribe called the Tebbu. It is possible to reach the Yellow River from there and there are again forests. If we can make it I will go there. We shall then return to Choni and see what turn things have taken, and if at all possible will make a rush to the Amne Machin, so I shall have next year free for the Richthofen Range. We have much material. There are a great many conifers in Tebbu land, many Piceas and Abies and others, some with cones resembling Tsuga but it cannot be Tsuga. On looking over a hillside one can pick out the various species by the size and shape of tree and color of foliage. My boys are good tree climbers and with our field glasses we can detect the fruits even if only near the very top. We have already several boxes full of plants and we have just begun. I think all in all we shall have a successful year. We have a few hundred birds all dried and packed. If it will not be possible to get to the Amne Machin we will work Tebbu land and north, of it: by the way, it is practically in the same latitude as the Amne Machin but of course much less high. From what I have seen so far and the climatic conditions the plants from Tebbu land, which is a high mountainous country, the lowest village being about 9600 feet, ought to do well in Massachusetts. I do not mean the lower Tebbu where Purdom worked, but the northern or upper Tebbu, where Purdom did not go. The Choni Prince assured me that no white man has been in his upper Tebbu country and that no collecting had been done there."

On June 29th he wrote,—

"In the meantime we will work the Tebbu country. From what I have seen there is a large number of species of Picea and probably Abies. It is impossible that they are all variations of either *Picea Meyeri* or *Picea Wilsonii;* the leaves and cones differ greatly, some are green when semimature, others crimson, others purplish black like Abies. Some are white beneath (the leaves), some dark green. The size and shape and arrangement of the leaves are very different in the various species. I think I found at least ten species of Picea. Where we are going now are said to be enormous forests of immense trees. The Pine found on the Minshan is certainly different from the Yunnan Pine; the needles are short and of a deep dark green, very different from the Yunnan Pine. *Pinus Armandi* I have not found here but in the south. Undoubtedly the Tebbu country is rich in conifers and I will endeavor to get seeds of all of them even should we go to the Amne Machin, I shall

arrange with a man, a young Tibetan, quite intelligent, and who has been in the Tebbu country with me, to collect the seeds of these various conifers. I shall leave one of my Nashi collectors behind also and then we will be able to get a good series."

On August 9th he wrote (his last letter),—

"Yesterday we returned from the trip (second) into the Tebbu land. I was greatly interested in the conifers there, and I am sure you will be surprised to learn of the great number of Abies and Picea found there. To be sure one of the most common Piceas is *P. Meyeri*. It forms forests but is found only on the outer margins of the Minshan. It rarely occurs with Abies and other Piceas but usually forms pure stands. The trees are easily recognized from a distance by their glaucous color and gray flaky bark. There are Abies 180–200 feet in height in Tebbu land and we felled a few trees in order to secure specimens. There are some with smooth whitish bark recognizable at a long distance. I took many photos of the trunks, branches, etc., but it is very difficult to photograph the trees owing to their height and their not growing in open country singly but in stands, also the terrain is so steep that it is difficult to do much photography of tall conifers. I spent several days in these forests and had many trees climbed, such as we could not climb we shot down specimens. We obtained a fine series of these various Abies and Picea. Mr. Rehder in his enumeration of the woody plants of North China says *P. Meyeri* is a very variable species. Here in this part of China there can be no mistake made as to the identity of *P. Meyeri*. The only variation that does exist here is in the color of the leaves which are glaucous in younger trees and green in old. The cones are at first (just before maturing) green and glossy, and the margins of the scales are reddish to purplish. The cones are often very long and slender but usually somewhat curved. There are a number of small fruited Piceas, some with red cones, some with deep blackish purple, some with small leaves glaucous or white streaked beneath, others uniformly green. The scales of the Abies cones are very different in the various species. . . . On the 13th I leave for the Kokonor. I am leaving three men behind to go to the Tebbu country to collect the seeds of all the various conifers and woody plants. There are many Primulas that are pretty and also quite a number of Meconopsis. The *Meconopsis integrifolia* is different here from the Yunnan species. I think we have a few new ones from Tebbu land. I am certain that these conifers and other trees will grow in Massachusetts. During the day we have a temperature of 84 Fahr. but a morning temperature of 30 Fahr. at 6 A. M. There was always ice on our tents every morning—this is August. In the winter the passes into Tebbu land are not negotiable. It is a most wonderful country, and no collecting has been done on the other side. Purdom worked in the Tao River basin and in Lotani which is on the Szechuan border south of Minchow."

Just a year from the time Rock sailed from San Francisco the first fruits of his journey were received at the Arboretum and consisted of five packets of seeds, one of Leptodermis, two of Lonicera, one of Prunus and one of Viburnum fragrans.

C. S. SARGENT.

ERRATA.

Page 141, line 14 from above for **longibrateata** read **longibracteata.**

" 144, line 9 from below for **Macgregorei** read **Macgregorii.**

" 150, line 5 from above for *S. senanensis* read *Phyllostachys bambusoides;* and on the same line for II *read* I.

" 151, line 15 from above for *fastosa* read *fastuosa.*

" 152, line 15 and line 17 from above for **Oreostachys** read **Oreiostachys.**

" 187, line 2 from above for Durrazo *read* Durazzini.

INDEX

Synonyms are printed in *italics;* new names in **bold-face type.**

Abies alba *f.* **compacta**, 204
— *Cedrus*, 205
— — *argentea*, 204
— lasiocarpa arizonica, 209
— *pectinata compacta*, 203
Acer *dasycarpum*, 209
— floridanum, 193
— leucoderme, 193
— Negundo, 193
— rubrum, 193, 209
— — tridens, 193
— saccharinum, 193, 209
— saccharum, 193, 209
Additions to our knowledge of the Flora of Hainan, 129
Aesculus octandra, 210
— Pavia, 193, 210
Alabama, Catalogue of Trees growing naturally in the vicinity of Sardis, Dallas County, 189
Albizzia julibrissin, 187
Aleurites cordata, 187
Alnus **Jackii**, 140
Amelanchier × *Sorbus*, 154
Amelanchier canadensis, 192
— *florida* × *Sorbus sitchensis*, 154
Amelasorbus, a new bigeneric hybrid, 154
Amelasorbus, 154
— **Jackii**, 154
American Trees and Shrubs in the park of Határmajor, Rumania, 208
Annales Musei Botanici Lugduno-Batavi, The exact dates of publication of, 211
Apodytes cambodiana, 136
— *javanica*, 136
Aralia spinosa, 194
Aristolochia durior, 209
— Kaempferi, 187
— *macrophylla*, 209
Arnold Arboretum expedition to north central Asia, 213
Arnold Arboretum, New species, varieties and combinations from the herbarium and the collections of the, 201
Arundinaria, 145
Arundinaria, 150
— anceps, 153
— armata, 153
— *baviensis*, 151
Arundinaria *callosa*, 151
— *Chino*, 147
— — *argenteo-striata*, 147
— *ciliata*, 152
— *communis*, 146
— *densiflora*, 152
— *densifolia*, 151
— *elegans*, 152
— Faberi, 150
— *falcata*, 151
— *Fargesii*, 148
— *floribunda*, 148
— *Fortunei*, 147
— gracilis, 153
— *graminea*, 146
— *Griffithiana*, 151
— *Hindsii*, 146
— — *graminea*, 146
— *hispida*, 149
— *Hookeriana*, 151
— *intermedia*, 151
— *japonica*, 147, 150
— jaunsarensis, 153
— khasiana, 151
— Kurzii, 153
— *Laydekeri*, 147
— *linearis*, 146
— *longiramea*, 148
— macrosperma, 150
— Mailing, 150
— Manni, 153
— *Matsunoi*, 146
— *Maximowiczii*, 146
— microphylla, 153
— *moliniformis*, 149
— Nagashima, 153
— *Narihira*, 151
— *niitakayamensis*, 148
— nitida, 153
— *Owatarii*, 150
— *Pantlingii*, 151
— *polystachya*, 151
— *pumila*, 151
— Ragamowskii, 153
— *rigidula*, 148
— Rolloana, 153
— *Sat*, 151
— *Simoni*, 147
— — *albo-striata*, 147

Arundinaria *Simoni argenteo-striata*, 147
— — *Chino*, 147
— — *heterophylla*, 147
— — *striata*, 147
— — *variegata*, 147
— *sinica*, 148
— *sinicica*, 148
— suberecta, 153
— tecta, 150
— *Tootsik*, 152
— *vaginata*, 147
— *Walkeriana*, 148
— *Wightiana*, 149
— — *hispida*, 149
— *Wightii*, 148
— Wilsonii, 150
Aster hispidus, 187
Aucuba japonica, 186
Baccharis halimifolia, 210
Bambusaceae, Two New Genera of, with special remarks on the related genera growing in eastern Asia, 145
Bambusa aff. B. pygmaea, 148
— *Chino*, 147
— *disticha*, 150
— *fastuosa*, 151, 217
— *Laydekeri*, 147
— *marmorea*, 151
— *Metake*, 147
— *quadrangularis*, 151
— *Simoni*, 147
— *stenantha*, 150
— *variegata*, 150
Begonia Evasiana, 187
Benzoin aestivale, 210
Berchemiella **crenulata**, 142
Betula nigra, 191
— papyrifera, 210
Bigeneric hybrid, Amelasorbus, A New, 154
Bladhia crispa, 186
Bocagea pisocarpa, 131
Brucea amarissima, 133
— *sumatrana*, 133
Bumelia languinosa, 194
— lycioides, 194
Calanthe striata, 186
Calpigyne **hainanensis**, 135
Campsis chinensis, 187
— radicans, 210
Canavalia ensiformis, 187
Carpinus caroliniana, 191
Carya alba, 190, 210
— *alba*, 210
— — subcoriacea, 190
Carya *amara*, 210
— aquatica, 190
— carolinae-septentrionalis, 190
— cordiformis, 190, 210
— glabra, 210
— laciniosa, 190, 210
— myristicaeformis, 190
— *olivaeformis*, 210
— ovata, 190, 210
— pallida, 191
— pecan, 210
— *porcina*, 210
— *sulcata*, 210
— *tomentosa*, 210
Castanea alnifolia floridana, 191
— dentata, 191, 210
— pumila, 191, 210
Castanopsis cuspidata, 187
Catalogue of Trees growing naturally in the vicinity of Sardis, Dallas County, Alabama, 189
Catalpa bignonioides, 194, 210
— speciosa, 210
Cedrus *Cedrus*, 205
— — *glauca*, 204
— *effusa*, 205
— *Libani*, 205
— — *argentea*, 204
— — *foliis argenteis*, 204
— — *glauca*, 204
— — *nana*, 205
— — *pendula*, 205
— libanotica, 205
— — *C. Libani*, 205
— — **glauca**, 204
— — **pendula**, 205
— — **nana**, 205
— *patula*, 205
Celtis laevigata, 192
— occidentalis, 210
— — crassifolia, 192
Cephalanthus occidentalis, 195
Cercis canadensis, 193, 210
Chamaecyparis Lawsoniana, 210
Chaydaia crenulata, 142
Chekiang, Two New Trees from, 144
Chimonanthus yunnanensis, 140
Chimonobambusa, 151
— **baviensis**, 151
— **callosa**, 151
— **densifolia**, 151
— **falcata**, 151
— **Griffithiana**, 151
— **Hookeriana**, 151

Chimonobambusa **intermedia**, 151
— **khasiana**, 151
— marmorea, 151
— **polystachya**, 151
— **pumila**, 151
— quadrangularis, 151
China, A New Species from Western, Syringa rugulosa, 153
Chinese Ligneous Plants, Further Notes on, 140
Chionanthus virginica, 194, 210
CHUN, WOON YOUNG. Two New Trees from Chekiang, 144
Cinnamomum pedunculatum, 188
Clematis virginiana, 210
Clerodendron japonicum, 188
— trichotomum, 187, 188
Clethra alnifolia, 210
COCKS, R. S., Catalogue of trees growing naturally in the vicinity of Sardis, Dallas County, Alabama, 189
Comptonia asplenifolia, 210
Cornus asperifolia, 194
— *candidissima*, 210
— florida, 194, 210
— racemosa, 210
— stolonifera, 210
Crataegi, Synopsis of North American, 5
Crataegus, Notes on, 1
Crataegus, A complete alphabetical list of all North American species and varieties will be found on pp. 9–77.
Crataegus, 192
— *albanthera*, 1
— algens, 192
— *ampla*, 2
— apiifolia, 192
— arduennae, 1
— *candens*, 1
— coccinea, 210
— coccinioides, 4
— *cordata*, 210
— Crus-galli, 1, 210
— — exigua, 1
— cupulifera, 4
Crataegus cirrata, 5
— **diversifolia**, 4
— *exigua*, 1
— *ferox*, 1
— Fontanesiana, 1
— *Fortunei*, 1
— *furcata*, 2
— *ignava*, 2
— **neofaxonii**, 2
Crataegus **neosmithii**, 2
— *olivacea*, 1
— padifolia **incarnata**, 4
— panda, 5
— phaenopyrum, 210
— **Ridgwayi**, 2
— simulans, 4
— sordida **villosa**, 2
— spathulata, 192
— *speciosa*, 4
— *strongylophylla*, 1
— tomentosa, 192
— viridis, 2
— *Wheeleri*, 4
— × **Whitakeri**, 3
Cryptomeria japonica, 187
Cymbidium ensifolium, 186
Cyrilla racemiflora, 193
Dacrydium elatum, 130
Daphne odora, 186
Deutzia **Chunii**, 140
Diervilla coreensis, 187
Dioscorea septemloba, 186
Diospyros virginiana, 194, 210
Dolichos *angularis*, 187
— lablab, 187
Drymoglossum microphyllum, 187
Drypetes **hainanensis**, 134
Eastern China, the Bonin and Liukiu Islands and of Formosa, The Rhododendrons of, 156
Eriobotrya japonica, 186
Ervatamia pallida, 143
Eugenia **multipunctata**, 138
Eupatorium Lindleyanum, 187
Eurya ochnacea, 187
Euscaphis japonica, 188
Evodia **Chunii**, 132
Evonymus japonica, 186
Exact dates of publication of Miquel's Annales Musei Botanici Lugduno-Batavi and Prolusio Florae Japonicae, The, 211
Fagara *mengtzeana*, 142
— **multijuga**, 142
Fagus grandifolia, 191
— — caroliniana, 191
Fargesia, 152
— **densiflora**, 152
— spathacea, 152
Fatsia japonica, 186
Ficus erecta, 186
Fissistigma **hainanense**, 131
— *maclurei*, 131
Flacourtia *Balansae*, 137

Flacourtia indica, 137
— *sepiaria*, 137
Forestiera acuminata, 194
Fraxinus americana, 194, 210
— caroliniana, 194
— pennsylvanica, 210
— — lanceolata, 194
Further Notes on Chinese Ligneous Plants, 140
Gleditsia triacanthos, 193
Gmelina indica, 137
Guatteria pisocarpa, 131
Gymnocladus dioeca, 210
Hainan, Additions to our knowledge of the Flora of, 129
Halesia carolina, 194, 210
— diptera, 194
— **Macgregorii**, 144, 217
Hamamelis *incarnata*, 208
— japonica **flavo-purpurascens**, 208
— — *obtusata*, 208
— macrophylla, 192
— *obtusata*, 208
— — *flavo-purpurascens*, 208
— virginiana, 210
Határmajor, Rumania, American Trees and Shrubs in the park of, 208
Heritiera **parvifolia**, 137
Holostemma sinense, 143
Hosta caerulea, 186
HU, H. H., Further Notes on Chinese Ligneous Plants, 140
Hybrid, Amelasorbus, a new bigeneric, 154
Icones selectae plantarum quas in Japonia collegit et delineavit Engelbertus Kaempfer, 186
Ilex decidua, 193
— latifolia, 187
— monticola, 193
— Oldhami, 187
— opaca, 193
— rotunda, 187
— vomitoria, 193
Indocalamus, 148
— **Fargesii**, 148
— **floribundus**, 148
— **niitakayamensis**, 148
— **rigidulus**, 148
— **sinicus**, 148
— **Walkerianus**, 148
— **Wightianus**, 149
— — **hispidus**, 149
Inula japonica, 187
Is Quercus arkansana a hybrid? 195
Itea **longibracteata**, 141, 217
Jasminum nudiflorum, 209
Joseph Banks: Icones selectae plantarum quas in Japonia collegit et delineavit Engelbertus Kaempfer, 186
Juglans nigra, 190
Juniperus *alpina*, 203
— chinensis **alba**, 202
— — *decumbens albo-variegata*, 202
— — *procumbens albo-variegata*, 202
— *communis depressa plumosa*, 204
— *elata*, 130
— **horizontalis alpina**, 203
— — **glomerata**, 202
— — **plumosa**, 204
— *japonica alba*, 202
— — *argentea-variegata*, 202
— *Sabina alpina*, 203
— virginiana, 190, 210
Larix Cedrus, 205
— *patula*, 205
Lasianthus gracilis, 140
Lilium cordifolium, 187
— speciosum, 187
Ligularia *Kaempferi*, 187
— tussilaginea, 187
Liquidambar styraciflua, 192, 210
Liriodendron Tulipifera, 192, 210
Lithocarpus cuspidata, 187
Litosanthes biflora, 140
Litsaea glauca, 188
Lonicera sempervirens, 210
Machilus Thunbergii, 188
Maclura pomifera, 209
Magnolia acuminata, 210
— denudata, 187
— grandiflora, 192
— kobus, 187
— liliiflora, 187
— macrophylla, 192
— pyramidata, 192
— tripetala, 210
— virginiana, 192
Malus angustifolia, 192
Mappia montana, 136
MCKELVEY, SUSAN DELANO, Syringa rugulosa, a new species from western China, 153
Meratia **yunnanensis**, 140
MERRILL, E. D., Additions to our knowledge of the flora of Hainan, 129
Mespilus Fontanesiana, 1
Metaplexis *Hemsleyana*, 143
— **sinensis**, 143

Miquel's Prolusio Florae Japonicae, The exact dates of publication of, 211
Morus rubra, 192
Myrica carolinensis, 210
— cerifera, 190
— rubra, 187
Nakai, T., Joseph Banks: Icones selectae plantarum quas in Japonia collegit et delineavit Engelbertus Kaempfer, 186.
— The exact dates of publication of Miquel's Annales Musei Botanici Lugduno-Batavi and Prolusio Florae Japonicae, 211
— Two New Genera of Bambusaceae, with special remarks on the related genera growing in eastern Asia, 145
Nandina domestica, 186
Neolitsea glauca, 188
New species, varieties and combinations from the herbarium and the collections of the Arnold Arboretum, 201
Notes, 213
Notes on Crataegus, 1
Nothapodytes montana, 136
Nyssa aquatica, 194
— biflora, 194
— sylvatica, 194, 210
Oreiostachys, 152
— **ciliata**, 152, 217
— Pullei, 152, 217
Orophea **hainanensis**, 132
Osmaronia cerasiformis, 210
Ostrya virginiana, 191, 210
Oxydendron arboreum, 194
Paederia chinensis, 186
Palmer, Ernest J., Is Quercus arkansana a hybrid? 195
— Synopsis of North American Crataegi, 5
Parthenocissus quinquefolia, 210
— tricuspidata, 188
Pasania cuspidata, 187
Persea Borbonia, 192
Phaseolus angularis, 187
Phyllochlamys *spinosa*, 131
— taxoides, 131
Phyllostachys bambusoides ontakensis, 217
Picea *pectinata compacta*, 204
— pungens, 210
— sitchensis, 210
Pinus Banksiana. 210
— *Cedrus*, 205
— — *effusa*, 205
— — *foliis argenteis*, 204
— — *glauca*, 204
— — *nana*, 205
Pinus echinata, 190
— *effusa*, 204
— glabra, 190
— Jeffreyi, 210
— palustris, 190
— ponderosa, 210
— resinosa, 210
— rigida, 210
— strobus, 210
— taeda, 190, 210
Planera aquatica, 192
Platanus occidentalis, 192
Pleioblastus, 145
— **communis**, 146
— **gramineus**, 146
— **Hindsii**, 146
— **linearis**, 146
— **Matsunoi**, 146
— **Maximowiczii**, 146
— — **argenteo-striatus**, 147
— **Simoni**, 147
— — **heterophyllus**, 147
— — **variegatus**, 147
Podocarpus macrophylla, 187
Popowia pisocarpa, 131
Populus balsamifera, 210
— — virginiana, 190
— *canadensis*, 210
— *deltoidea*, 210
— heterophylla, 190
Prunus angustifolia, 193
— caroliniana, 193
— lanata, 192
— Laurocerasus, 209
— lusitanica, 209
— Munsoniana, 192
— serotina, 193
— umbellata, 192
Pseudosasa, 150
— **disticha**, 150
— japonica, 150
— Owatarii, 150
— **variegata**, 150
Pseudotsuja *Douglasii*, 210
— taxifolia, 210
— — caesia, 210
Ptelea trifoliata, 193
Pueraria hirsuta, 187
Pyracantha coccinea, 209
Quercus arkansana a hybrid? 195
Quercus alba, 191, 210
— — latiloba, 191
— arkansana, 195
— austrina, 191

Quercus bicolor, 210
— borealis maxima, 191, 210
— Bushii, 192
— *caput-rivuli*, 200
— Catesbaei, 191
— cinerea, 191
— coccinea, 210
— — tuberculata, 191
— Durandii, 191
— *falcata*, 210
— glauca, 186
— imbricaria, 210
— laurifolia, 191
— lyrata, 191
— macrocarpa, 210
— marilandica, 191
— *minor*, 210
— Muehlenbergii, 191
— nigra, 191
— obtusa, 191
— phellos, 191
— *platanoides*, 210
— Prinus, 191, 210
— *rhombica*, 191
— rubra, 191, 210
— — pagodaefolia, 191
— *rubra*, 210
— Shumardii, 191
— — Schneckii, 191
— stellata, 191, 210
— — Margaretta, 191
— — stolonifera, 191
— **Stewardii**, 207
— subintegra, 192
— velutina, 191
Raphiolepis umbellata, 188
REHDER, ALFRED, Amelasorbus, a new bigeneric hybrid, 154
— New species, varieties and combinations from the herbarium and the collections of the Arnold Arboretum, 201
Rhamnus caroliniana, 193
Rhodea japonica, 186
Rhododendron chrysocalyx Lév. & Vaniot, 200
— **anwheiense**, 163
— *Argyi*, 174
— boninense, 184
— *brachycarpum*, 164
— breviperulatum, 180
— *breviperulatum*, 181
— Championae, 178
— *chrysanthum*, 161
— chrysocalyx, 200
Rhododendron *ciliato-pedicellatum*, 169
— dauricum mucronulatum, 174
— **Dunnii**, 170
— ellipticum, 174
— *ellipticum*, 176
— Farrerae, 185
— fokienense, 167
— *Fordii*, 166
— formosanum, 165
— Fortunei, 159
— hainanense, 182
— Henryi, 169
— hyperythrum, 168
— Kaempferi, 188
— Kanehirai, 182
— Kawakamii, 173
— *lamprophyllum*, 174
— lasiostylum, 182
— Latoucheae, 178
— leiopodum, 176
— *leptanthum*, 176
— *leptosanthum*, 176
— Levinei, 172
— longiperulatum, 183
— Mariae, 184
— Mariesii, 185
— molle, 186
— Morii, 164
— Nakaharai, 183
— nankotaisanense, 163
— Oldhamii, 185
— ovatum, 174
— *pachysanthum*, 164
— pseudochrysanthum, 161
— rubropilosum, 182
— *rubropunctatum*, 168
— **Sasakii**, 181
— scabrum, 185
— Seniavinii, 184
— *serpyllifolium*, 183
— simiarum, 166
— Simsii, 182
— — eriocarpum, 183
— *spec.*, 171
— Tanakai, 175
— Tashiroi, 171
— Westlandii, 168
— Wilsonae, 176
Rhododendrons of eastern China, the Bonin and Liukiu Islands and of Formosa. The 156
Rhus aromatica, 210
— copallina, 193, 210
— typhina, 210

Rhus vernix, 193
Ribes sativum **striatum**, 208
— — **variegatum**, 208
— *vulgare striatum*, 208
— — *variegatum*, 208
Robinia luxurians, 211
— *neo-mexicana*, 211
— Pseudoacacia, 193
Rock, J.: see Arnold Arboretum Expedition to north central Asia 213
Rubus **Chungii**, 141
— parviflorus, 211
Salix *arenaria*, 206
— *argentea*, 206
— *californica*, 206
— *depressa nitida*, 206
— *fusca argentea*, 206
— — *arenaria*, 206
— *grisea*, 206
— — *pendula*, 206
— *lanata*, 206
— Matsudana "*lung chao liu*," 206
— — tortuosa, 206
— — "*Saule Man-tou-liu*," 205
— — **umbraculifera**, 205
— nigra, 190
— repens *arenaria*, 206
— — *argentea*, 206
— — *S. arenaria*, 206
— — *S. argentea*, 206
— — *dunensis*, 206
— — *lanata*, 206
— — *latifolia*, 206
— — nitida, 206
— — *sericea*, 206
— spec., 190
Salix spec., 204
Sambucus canadensis, 211
SARGENT, C. S. The Arnold Arboretum expedition to north central Asia, 213
— Notes on Crataegus, 1
Sasa, 149
— bitchuensis, 149
— chartacea ,149
— kurilensis, 149
— nana, 149
— *niitakayamensis*, 148
— — *microcarpa*, 148
— nipponica, 149
— purpurascens, 149
— ramosa, 150
— senanensis, 150
— Shimidzuana, 150
— **stenantha**, 150
Sasa **tessellata**, 150
— **Tokugawana**, 150
— Tsuboiana, 150
— Veitchii, 150
Sassafras officinale, 192
Semiarundinaria, 151
— fastuosa, 151
— **Pantlingii**, 151
— **sat**, 151
Sinobambusa, 152
— **elegans**, 152
— tootsik, 152
Skimmia japonica, 186
Smythea **nitida**, 136
Sorbus sitchensis × *Amelanchier florida*, 154
Symplocos **Chunii**, 138
— **fasciculiflora**, 139
— japonica, 187
— tinctoria, 194
Synopsis of North American Crataegi, 5
Syringa rugulosa, A new species from western China, 153
Syringa **rugulosa**, 153
Tabernaemontana **pallida**, 143
Taxodium ascendens, 190
— distichum, 190, 211
— — *imbricarium*, 190
Taxotrophis macrophylla, 130
— *taxoides*, 131
Taxus *canadensis* × *cuspidata*, 201
— × **Hunnewelliana**, 201
Tecoma radicans, 210
Thuja *gigantea*, 211
— occidentalis, 211
— plicata, 211
Tilia americana, 211
— floridana, 194
— — oblongifolia, 194
— heterophylla, 194
— — Michauxii, 194
— nuda, 193
— — glaucescens, 193
Torreya **Jackii**, 144
Trichosanthes cucumeroides, 188
Trophis spinosa, 131
Tsuga canadensis, 211
Two New Genera of Bambusaceae, with special remarks on the related genera growing in eastern Asia, 145
Two New Trees from Chekiang, 144
Ulmus alata, 192
— americana, 192
— *campestris Dauvessei*, 207
— *Dauvessei*, 207

Ulmus fulva, 192
— hollandica **Dauvessei**, 207
— *montana Dauvessei*, 207
Vaccinium arboreum, 194
Viburnum Lentago, 211
— rufidulum, 195
Vitis **chunganensis**, 143
— **fagifolia**, 142
Wilson, Ernest H., Rhododendron chrysocalyx Lév. & Vaniot, 200
— The Rhododendrons of eastern China, the Bonin and Liukiu Islands and of Formosa, 156
Xanthophyllum **hainanense**, 142
— *Maingayi*, 134
— *palembanicum*, 134
— racemosum, 134
— *racemosum*, 142
Zanthorhiza apiifolia, 211
Zanthoxylum clava-Herculis, 193
— *multifoliolatum*, 142
— *multijugum*, 142
Zingiber mioga, 186

2556-42